THE IRON AGE

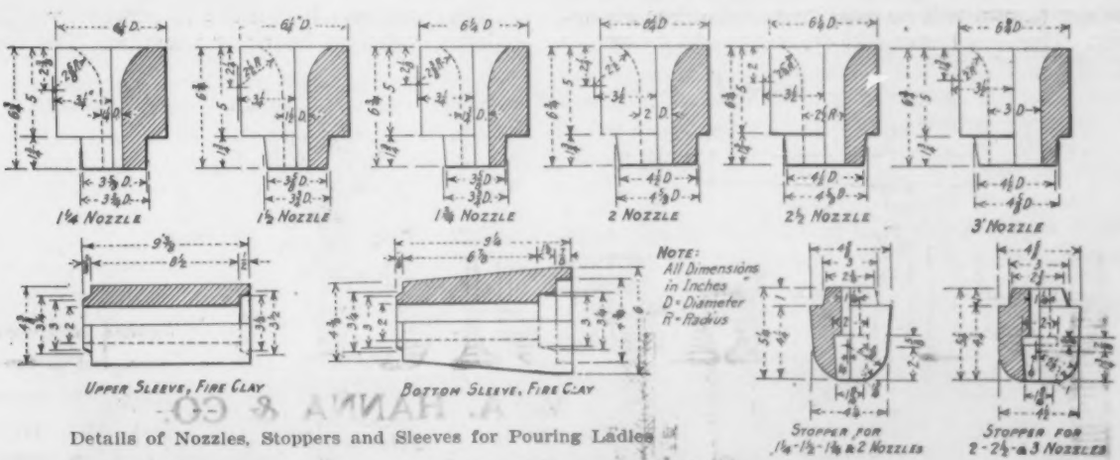
New York, February 12, 1920

ESTABLISHED 1855 VOL. 105: No. 7

New Acid Steel Foundry at Alliance, Ohio

Hot Water Conservation and Oven Car Bearings Among Interesting Features — Details of the Pouring Ladles

AN interesting example of modern type of steel foundry designed for a wide range of work in castings from the smallest size up to 45 tons is found in the new plant of the Machined Steel Casting Co., Alliance, Ohio. This company was organized last June primarily to make castings for the Alliance Machine Co., with which it is closely affiliated, W. H. Purcell being president of both companies. The requirements of the latter company cover castings in a wide range of sizes for electric traveling cranes and other lines of equipment, including rolling mill machinery, which the Alliance Machine Co. has added to its line of products.



Details of Nozzles, Stoppers and Sleeves for Pouring Ladles

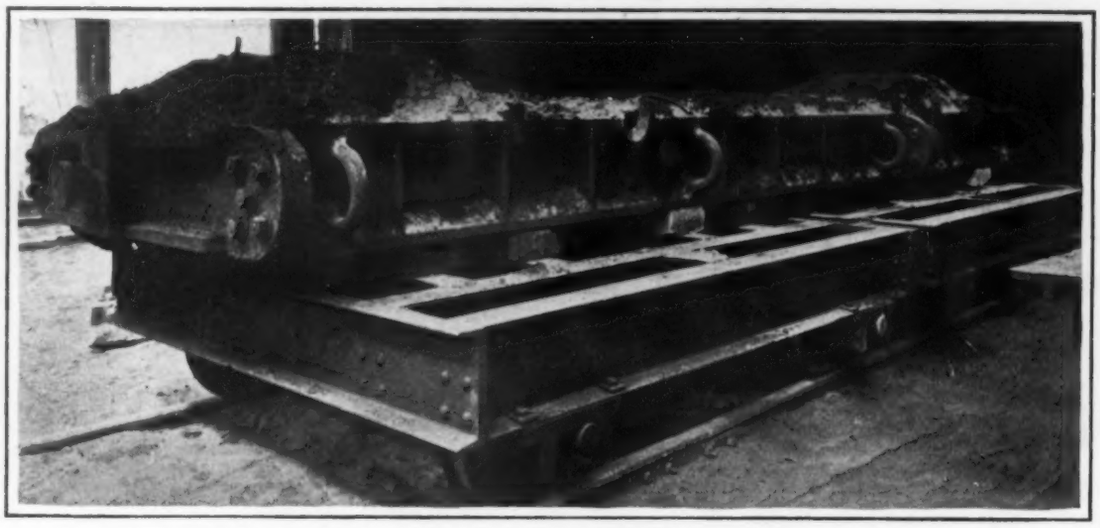
The first heat in the foundry was poured late in December, and among the first castings that are being made are 32 housings for the mills for the new Niles, Ohio, plant of the Republic Iron & Steel Co. Each of these castings will weigh 34,000 lb. The plant is designed for both floor and matchboard work, although floor molds will predominate. In addition to supplying the Alliance Machine Co., the foundry will do a commercial business in steel castings of any required specifications.

The foundry has one acid open-hearth furnace rated at 25 tons but with a maximum capacity of 30 tons, and a second furnace of the same capacity is being installed. Both will be used when the largest castings are being made and for which the capacity of one furnace is not sufficient to supply the metal but ordinarily only one furnace will be operated, the other serving as a spare unit. Three or four heats will be run per day and the plant will have a normal capacity of 1,000 tons per month, although it is expected that this will be increased to 1200 tons when the castings are running unusually heavy.

The plant is laid out for convenient and economical operation and with a view of making extensions when required. A large amount of window surface provides good lighting, and both the heating and ventilation have been given attention in order to make the foundry as comfortable a place as possible in which to work. One of the interesting features of the foundry is that oil is used exclusively for fuel, the open-hearth and annealing furnaces, core and mold drying ovens and the heating plant being oil fired.

The foundry building is 400 ft. long and 72 ft. wide, and has a lean-to 30 ft. wide extending the entire length. The south end of the main building is used for molding work and the north end for the cleaning department. The east lean-to, which is not partitioned off and in reality forms an additional bay to the main building, is used for a sand mill room, core room, snap flask molding and for a cleaning room. The west lean-to is partitioned off from the main foundry floor and is divided up into rooms occupied by the pattern storage, pattern making and repair department, power plant, lockers and toilet rooms with showers, and the offices. This lean-to has a second floor covering the offices and several other sections, providing space for the storage of patterns.

The main building is of steel construction with brick walls 5 ft. 6 in. high. Above these walls the sides are covered with corrugated iron and factory ribbed glass, the latter in steel sash. The roof is

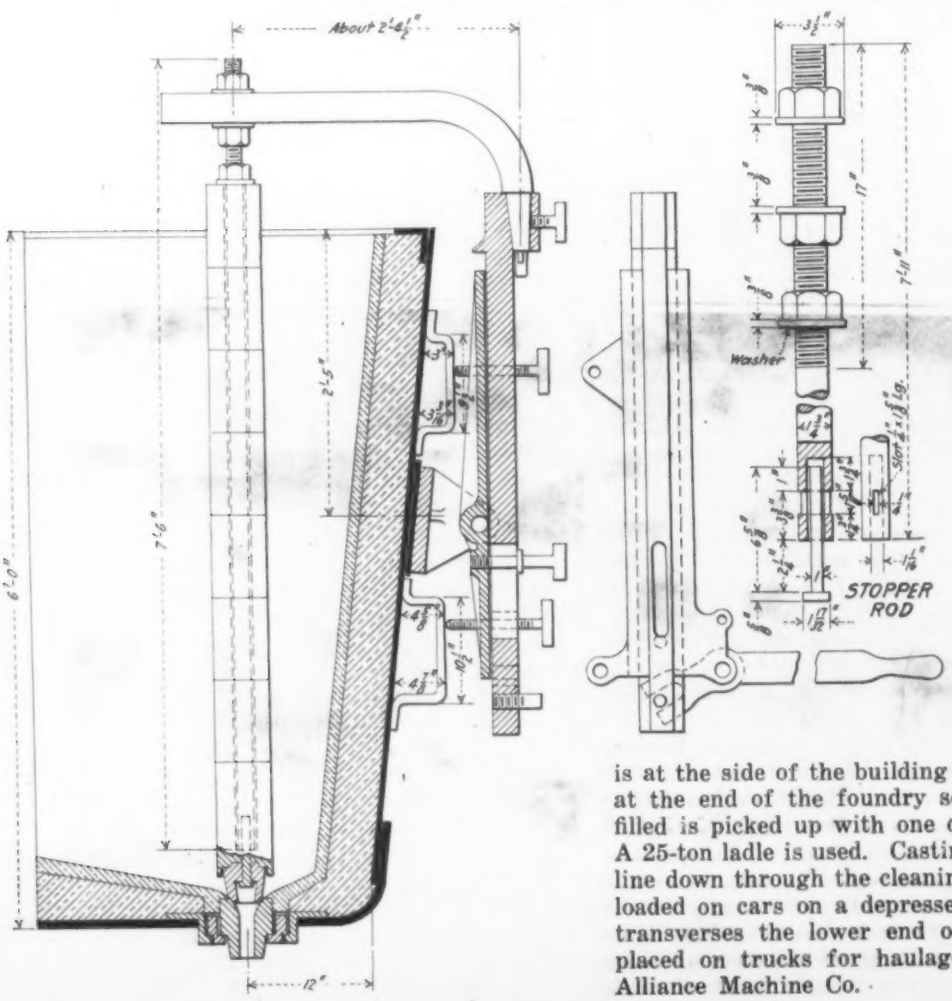


Specially Designed Bearings Are Used on the Cars for the Mold Drying Ovens

of the monitor type, the monitor having sloping sides with swinging glass sections for ventilation. More light comes into the sloping windows of the monitor than would were the sides perpendicular, and it was for this reason that this design was adopted. The roof is of cement tile. The main building is 38 ft. in height to the roof trusses and 63 ft. to the peak of the roof. It is served by a 30-ton and a 15-ton Alliance electric traveling crane with a 75-ft. span in the main bay. Duplicates of these cranes will be installed. In the east lean-to there is a 5-ton crane. Supplementing the overhead cranes four jib cranes will be installed, two on each side of the building columns for handling flasks, molds, etc., and will be used largely on match-board work. These will have a 25-ft. radius and a capacity of 2½ tons at the end of the boom and will be equipped with trolleys and air hoists.

The open-hearth building is located at right angles to the foundry building at its south end and is of the same general design. It is 140 ft. long and 92 ft. wide. From this building a crane runway extends 150 ft. out over the stock yard for pig iron, scrap and sand. The open-hearth building and stock yard are served by a 15-ton crane with a 90-ft. span and equipped with a magnet. A receiving track runs through the stock yard and to the end of the open-hearth building and space is provided in this building for such raw material as is desired to place under cover.

The open-hearth furnace is served by a 25-ton Alliance high type charging machine. The furnace



Design of Stopper Arm and Grooved Glide. The stopper arm has a slot in which the stopper rod may be adjusted to seat properly

is at the side of the building with the pouring side at the end of the foundry so that the ladle when filled is picked up with one of the foundry cranes. A 25-ton ladle is used. Castings move in a straight line down through the cleaning department and are loaded on cars on a depressed shipping track that transverses the lower end of the foundry or are placed on trucks for haulage to the plant of the Alliance Machine Co.

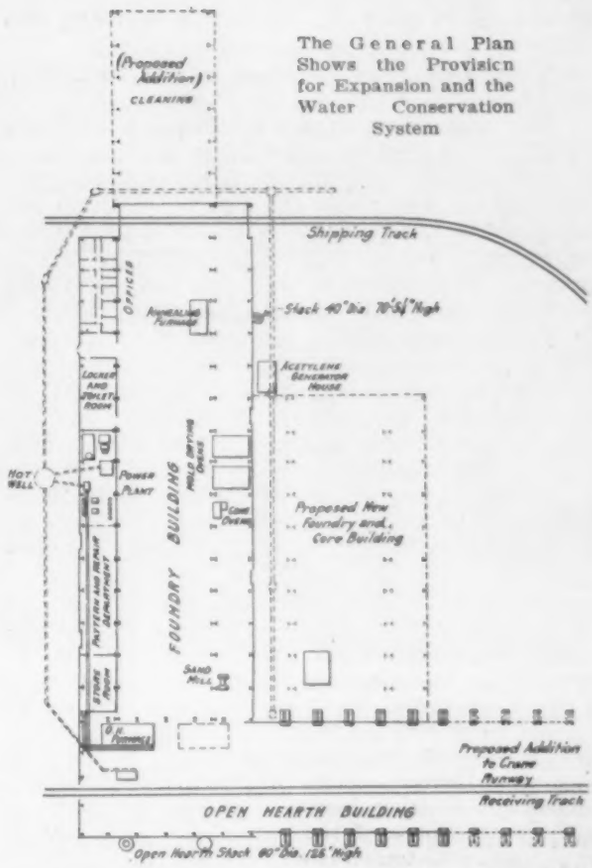
The arrangement of the plant is shown in the accompanying illustration which also shows proposed locations of additions both at one side and at the lower end. Space is provided in the open-hearth building for the installation of any additional furnaces that may be required because of enlargement of the molding floor. As the company owns a 17-acre site there is sufficient room for growth as well as for the dumpage of refuse. Waste sand, slag, etc., are hauled to the dump with a gasoline tractor having a 1 cu. yd. dump body made by the Clark Truc-tractor Co.

An interesting method is employed in conserving the water supply. The open-hearth furnace is equipped with water-cooled doors and door frames supplied by the Blaw-Knox Co. and the water from these doors and frames flows to a hot well located outside of the foundry near the power plant, its location being shown in the drawing. From this well it is pumped back to the furnace doors and frames, some water being added from the city mains to cool it sufficiently for re-use. Water used for cooling purposes in connection with the air compressor also runs into the hot well, to be used over again, and the water supply for the heating boiler is taken by the boiler feed pump from the hot well so that pre-heating of this water is not required and there is a saving in fuel.

For annealing large castings a pit type of furnace is used, 25 ft. long, 15 ft. wide and 9 ft. deep. This furnace with a removeable top, similar to the top of a malleable iron furnace, permits the handling of heavy castings to and from the furnace with a traveling crane and does away with the need of charging cars so that nothing but the castings go into the furnace. A small hot bottom type of annealing furnace with a chamber 8 x 10 ft. is used for annealing small castings.

There are two core ovens, one 15 ft. deep and 7 ft. 6 in. wide for large cores, and a small shelf-type quick-drying oven for small cores. As the small cores are left in the oven different lengths of time, depending on the size, the oven is not loaded at one time, but cores are placed on a shelf and left as long as needed, regardless of the charging of the other shelves. Cores for the large oven are loaded on a truck which is pushed in the oven by hand.

There are two mold drying ovens which can also be used for large cores. These are 30 ft. deep and



The General Plan Shows the Provision for Expansion and the Water Conservation System

20 ft. wide. Each of these ovens has two standard-gage tracks, each track holding 3 cars, making the capacity of the oven 6 cars. These charging cars are of heavy steel construction 8 ft. long and 6 ft. wide and were built by the company. A special feature is the car bearings. This consists of a cast-steel bracket with a bearing surface about 5½ in. wide that rests on the axle. The bearing is attached to the side frame by two bolts on each side of the I beam used in making the side frame. The axle is a 3-in. shaft turned down 1/32 in. after the wheel is pressed on, to provide a smooth finish, and the inner side of the bracket in which the axle loosely turns is also finished to provide a smooth bearing surface. The advantage of this type of bearing is that there is no need of lubrication, which becomes

Large Castings Are Cleaned in a Steel Sand Blast and Small Castings in a Sand Blast Tumbling Barrel, Shot Being Used in the Place of Sand for Cleaning

burned out in the oven. While not requiring this attention the bearing is greased occasionally. The oven equipment was furnished by the Ohio Body & Blower Co., Cleveland.

For cleaning castings a steel sand blast house 12 x 12 ft. is provided for large castings and a 50 x 40 in. blast tumbling barrel for small castings. The two cleaning units are side by side and are connected to an exhaust system that discharges above the lean-to roof. Shot is used exclusively in place of sand for sand blasting. The sand blast outfit was supplied by the Pangborn Corporation.

Oxy-acetylene torches are used for cutting off risers, gas being piped to the cleaning room from a generator house just outside the plant that is equipped with a Davis-Bournonville generator. The cleaning department is also provided with a 500-ampere Westinghouse arc welding machine.

An interesting feature of the plant is the ladle stopper rod operating mechanism, the details of which were worked out by W. E. Prump, first vice-president and general manager of the company, who has given this matter a great deal of study. The advantages claimed for the stopper rod arrangement and mechanism are its simplicity and ease of operation. The slide is of the groove type and with a slight pressure on the lever the stopper rod moves up and down very easily and it is stated that there is never any trouble caused by binding in the slide and guide. The stopper arm is designed with a slot in which the stopper rod fits, which permits a careful adjustment of the stopper rod when setting the stopper so that the latter will seat properly. The bottom sleeve fits over the stopper in such a manner that metal is prevented from working in between the sleeve and stopper and burning off the stopper rod pin, and the method of keying the stopper to the stopper rod has the advantage of simplicity.

The bottom sleeve has considerable taper from the bottom to the top and the top sleeves are rather small in diameter. It is pointed out that this is possible with acid practice but with basic practice the sleeve should be 1 in. larger in diameter, which makes the bottom sleeve more nearly straight at the sides.

After the stopper rod is set the nut at the top of the sleeves is backed off giving a ½-in. clearance to allow for the quicker expansion of the sleeves than of the stopper rod. Otherwise the stopper head might be broken off, with serious consequences. This has been adopted as standard ladle practice, after careful experiments. In these experiments it was found that an individual sleeve 9⅜ in. long expands about 3/32 in. and the entire length of sleeve on the stopper rod, which is about 81 in., expands from ⅞ in. to 1 in. during the pouring of the heat. This maximum expansion of the sleeve is much faster than the expansion of the rod. The expansion of a stopper rod of the same length is about 1⅛ in. on an average, and the maximum expansion is reached when the rod reaches a temperature of about 2000 deg. Fahr., which is about 45 min. after the heat is tapped.

When making these experiments it was found that immediately after the heat was in the ladle, the sleeves took up the ½-in. clearance and were practically tight against the nut and remained so for about 10 min. Then because of the expansion of the rod the clearance gradually increased so that 11 min. after this reading was taken there was 3/16-in. clearance, 12 minutes later there was 7/16-in. clearance and 8 min. later there was ½-in. clearance, which remained until the heat was completely poured.

Fuel oil is stored in two 50,000-gal. tanks. Two electrically driven pumps, each with a capacity of 2000 gal. per minute, are provided to pump the oil from the cars to the tanks and from the tanks to a stand pipe 10 in. in diameter and 50 ft. high, from which it is fed to the various consuming units.

The foundry is provided with a fan heating system guaranteed to keep the temperature up to 50 deg. when it is zero outside. The air, heated by passing through coils of steam radiation, is forced into a 54-in. tile main that extends under the floor across the main building near the center, and from this main 36-in. distributing lines branch off passing along the side walls on both sides of the building. From these the hot air is discharged into a foundry through galvanized steel outlets, provided with dampers that are located 30 in. above the floor around the sides of the foundry. The heating system was installed by the Buffalo Forge Co.

In the power plant, in addition to the heating system, are two 150-kw. rotary convertors, and an Ingersoll-Rand air compressor with a capacity of 1300 cu. ft. per min., which supplies air to the chipping hammers. The electrical current is supplied from a commercial circuit. Direct current is used for the cranes and grinding machines and alternating current for the remainder of the machinery and lighting.

The artificial lighting of the plant was given a great deal of attention. The lamps, which are of the Mazda type, are hung high under the roof trusses and are of various voltages and in different sizes of reflectors and are arranged in staggered positions. The lighting plans were prepared by the Western Electric Co., which installed the lighting equipment.

The foundry is operated on two eight-hour shifts in the molding and core-making departments from 7 a. m. to 3:30 p. m. and from 3:30 to 11:30 p. m., with 30 min. for lunch. A gang is employed from midnight until morning shaking out the molds and getting the foundry floor in shape for the morning work. Other parts of the foundry are operated on a single nine-hour shift.

Outlook for Motor Industry

An interesting prediction as to the outlook in the automobile industry made by President Christian Girl, of the Standard Parts Co., Cleveland, is contained in the last issue of *The Standard Parts Messenger*, published by that company. In this Mr. Girl says:

"In my opinion the demand for cars this year will far exceed the demand in 1919 and should run from 3,000,000 to 3,500,000 cars, including trucks. Production will be nowhere equal to the demand, and if it should run at the rate of 2,250,000 cars for the year, it is possibly all that can be expected. Cars are being designed better than formerly and lasting longer. Replacement business will not amount to as much in proportion in the future as in the past, but this is in the tendency to greater economy in the entire industry, and in the use of automobiles, and should be a benefit rather than a detriment.

"In my opinion, it will be impossible for supply to overtake demand within the next three years, after which the rehabilitation of other portions of the world and demand from them upon us for motor car means of transportation will be sufficient to afford an excellent market for our product for many years to come."

The meeting of the National Crane Builders' Association, at the Hotel Astor, New York, Feb. 6, was adjourned until the first week in March, owing to the weather that prevented many from attending and the illness of some of the officers of the association. The next meeting will probably be called in either Cleveland or Chicago.

Blast Furnace Plant Built in One Year

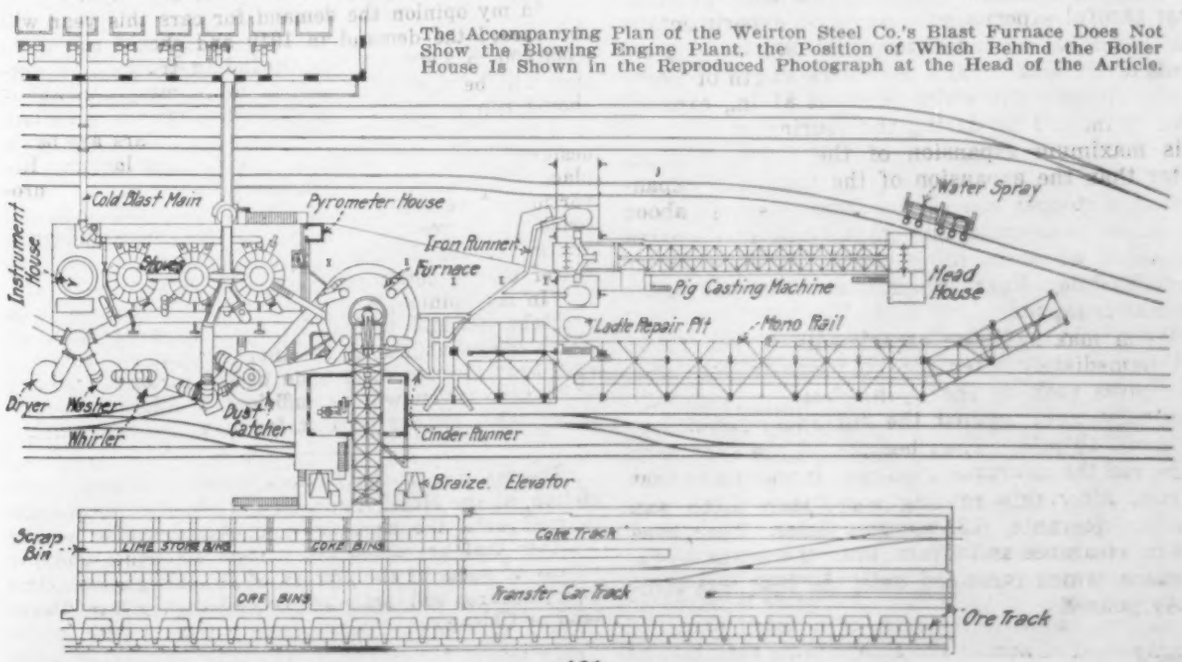
Weirton Stack with Complete Equipment and Full Provisions for Future Additions Constitutes First of a Series of Improvements

THE construction of a complete blast furnace plant within one year constitutes an enviable record in itself, but the fact that plans were started less than four weeks before the excavation work was begun adds emphasis to the performance of the engineers in charge of design and construction. The furnace in question is the first to be built for the Weirton Steel Co., Weirton, W. Va., and was blown in July 21, 1919, following a construction period of 364 days, ground having been broken July 22, 1918. The site of the plant adjoins the Chester branch of the Pennsylvania Railroad, near the main line between Pittsburgh and Steubenville. The Ohio River forms the northern boundary of the plant, the general yard level being 88 ft. above water level.

The problem presented to the designers was complicated by the fact that the plans had to be drawn not only in conformance with the maximum economy in the arrangement of the original units but with due regard to expansion of this first unit, without any interruption in operations, into a plant of three furnaces; also the requirement that all steam and power generation and pumping facilities for the entire furnace and steel plant, exclusive of open hearth waste heat boilers, be concentrated at the blast furnace blowing room or power house. An additional factor which had to be taken in account was that during the first 12 to 18 months of blast, pending the completion of the open hearth and steel works, the plant would have to be utilized as a merchant furnace, after which it would revert to an operation tied in with by-product coke ovens and the exigencies of modern steel plant practice.

No. 1 furnace is 92 ft. x 22 ft. 6 in., and the capacity from tap hole to bottom of bell is 25,500 cu. ft. The lining is heavier at the bottom thus to afford maximum thickness where required and to give moderate thickness where excessive depth of lining is detrimental. No interior water cooling is given the lining above the mantle but a permanent pipe spray with connection is affixed to the shell. Six rows of bosh plates are placed in the bosh wall; the tuyere breast is cooled by two plates between and flush with the top of the cooler arches, one plate between the cooler arches, and two rows of plates beneath the cooler arches. The hearth walls are cooled by the cast-in cooling pipe of the hearth jacket. The stock line is afforded protection by cast-iron wearing plates of high combined carbon content. These plates are laid integral with the lining and are of small surface dimension in each unit. The lining is made up of General Refractories Olive Hill brick.

The iron and steel work of the furnace consists of a heavy continuous cast-iron sub-base, with heavy anchor bolts from the iron sub-base to the concrete foundation. The concrete foundation for the column base is reinforced by tension bands which encircle it



The Accompanying Plan of the Weirton Steel Co.'s Blast Furnace Does Not Show the Blowing Engine Plant, the Position of Which Behind the Boiler House Is Shown in the Reproduced Photograph at the Head of the Article.

on the outside, and the column base and columns are reinforced by a tension band at the column base and by reinforced concrete encircling the base plates and columns. There are 10 cast-iron columns, made in two sections and encased in fire brick. The columns are placed in a leaning off-set position, the diameter of the base circle being greater than the diameter of the top circle. This is to allow room for work about tuyeres and plates, to place the columns at a more remote location from a possible breakout, and to afford possibility of enlargement.

The bustle pipe, circle pipe and trough are hung from the top segment of the columns by riveted or cast-on saddles. This arrangement, together with special design of circle pipe inlets and trough overflows, allows room for a walk on the bustle pipe, thus giving access to three-way cock and water discharges entirely free from suspension strap or pipe interferences.

The hearth jacket is of cast-iron segments, 16 in all with pipe cast in, and is heavily wedge-banded and bolted. Taper construction is used to maintain a safe thickness of hearth wall against erosion and to maintain ample brick at the bottom to prevent short holes. The tuyere breast is of butt strap-plate armored construction, with 10 cast-steel tuyere cooler frames. The bosh is reinforced with heavy steel butt strap bands, the bands being held by cast-steel distance pieces to prevent slipping. The mantle is of built-up plate and angle construction and is provided with a trough with drainage connections for collecting shell spray water.

The furnace shell is of butt-strap construction on both the top and two bottom rings. Intermediate rings are of double and triple-riveted construction. The shell is surmounted by a Kennedy-type dome of heavy construction, integral with the shell. The furnace top is of the stationary double bell-type Brassert design. The large bell is hung by Ives' bell suspension. The top is laid out with particular reference to an abrupt and correct assumption of the dumping position by the skip, the high dumping speed of the skip, adjustable skip lip and deflector plate, adjustable centering of hopper and bells, and with volumetric proportions of throat and hopper areas of bells worked out by combined experimental layouts and practice results.

The gas is taken off by four off-takes from an annular gas space about the big bell hopper, which both reduces the average gas velocity and eliminates segregated velocity areas above the stock and past the bell lip, which reduces the production of flue dust. These off-takes combine into four up-takes, two of which are surmounted by Baer safety valves. The up-takes lead into four downtakes, each two combined into one downcomer. The two downcomers enter the dust catcher radially. The gas leaves the dust catcher at the top, where there is provided a gas bleeder valve, and passes to a Brassert-Witting tangential whirler. From the whirler the gas is passed through a Brassert washer with a vertical water seal separator, and thence to the stoves and boilers.

A by-pass is provided so that gas from the whirler may be sent direct to the boilers rough-cleaned—the gas for the stoves only being passed through the washer —or so that in necessity rough-cleaned gas may be sent to both stoves and boilers. Water seals are provided so that the stoves or boilers may be singly or combinedly shut off from the entire cleaning system or furnace at cast or shut-down, and so that the wet cleaning may be isolated from the dry cleaning system whenever desired or necessary. The water seal valves are all supplemented with goggle valves. Bleeders are provided at the extreme ends of both boiler and stove gas mains.

The washer is of the improved Brassert construction. Briefly, it embodies the principle of two-stage scrubbing, combining a first cleaning stage to eliminate the rougher and heavier portion of the dust and to effect cooling, followed by a second stage in the same tower to eliminate fine dust and fumes. The gas entering at the bottom is distributed by a perforated inverted frustrated cone, and passes through three banks of superimposed offset baffles. All water is introduced at the top baffles in the form of a heavy spray, the arrangement of nozzles and sprays being such that gas and spray are churned into intimate contact. The spray coalesces into rain in the baffle chambers and falls through the tower, its descent being impeded and distributed by the lower hurdles. A pronounced increase in the retention period of water in the scrubber and a consequent economy in water and the cleanliness of the gas are effected.

A special characteristic of the washer is its ability to handle heavily dust laden gas from rough working or slipping furnaces. The water seal separator is a receiver that gives the gas three alternations of acceleration and retardation in velocity, in combination with a simultaneous reversal of direction of flow. It is used both to remove entrained water carried by gas from the washer and as a water seal after the washer. Long experience with this type of cleaner is stated to have demonstrated a reliability, utility and dependability which more than compensate in practical operating practice for the actual loss of four per cent in heat abstracted from the gas. The Dougherty system of steam for the prevention of gas explosion is used on the gas main system.

The stoves are three in number, 22 ft. x 100 ft., with a total heating surface of 285,000 sq. ft. They are of the two-pass side-combustion type, having checker openings 3½ in. square. The checkers, arch and draft chamber design follow the Brassert-Jones construction. This design equalizes the flow of ascending gas and descending air through the checker openings, and overcomes the usual tendencies towards segregation or selective draft areas in the checker opening area with resultant hot and cold idle checker segments. This stove equipment, due to its relatively high heat transfer rate and low radiation loss, provides blast heat and heat reserves for 45,000 cu. ft. of wind. The stove is insulated throughout with sil-o-cel powder and brick, and the blast mains with Johns-Manville thermo fire felt.

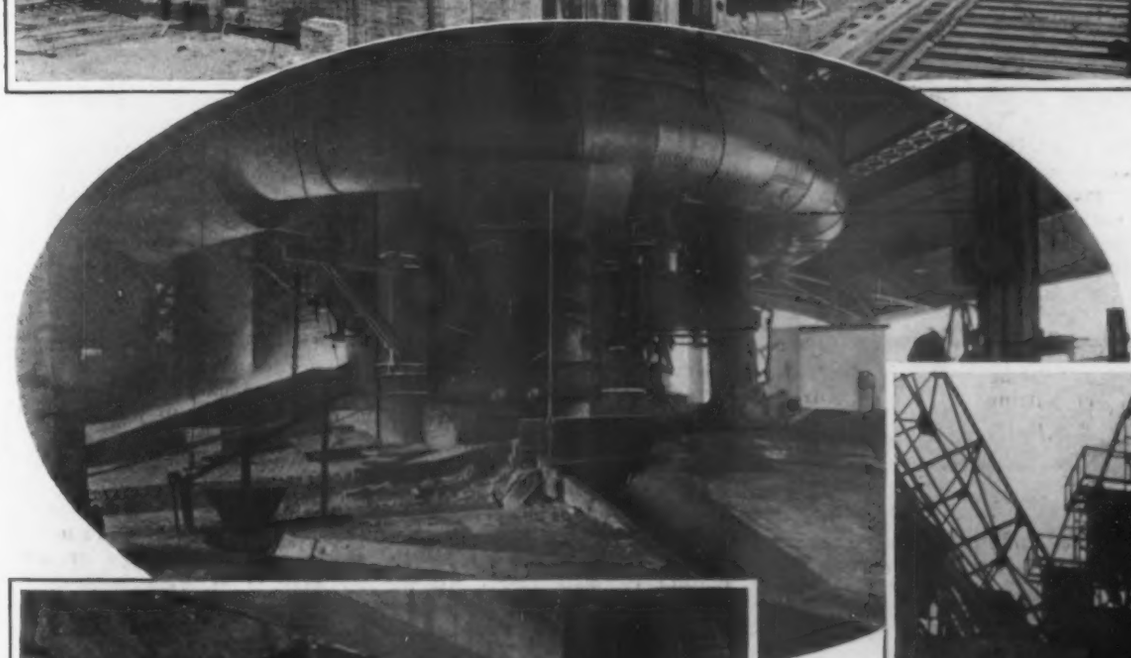
The stove trimmings include blow-off valves turned down into chimney draft flues, two chimney valves, Universal gas burners, and Mathesius hot blast valves. The stoves are served by a Heine brick lined reinforced concrete stack, 9 ft. 6 in. x 225 ft. This stack will also serve the next block of stoves to be built in conjunction with the projected No. 2 furnace.

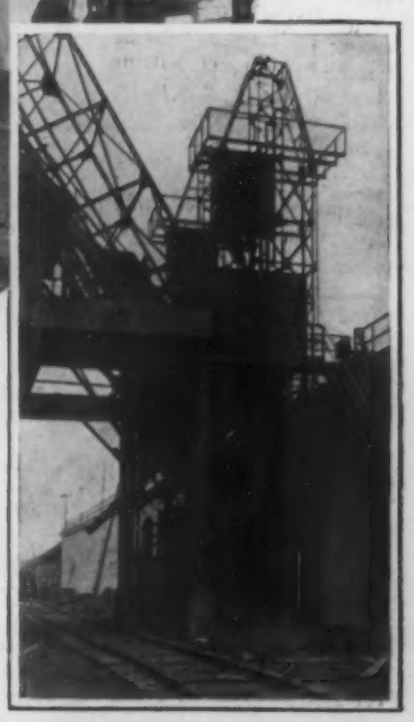
The cold blast line is provided with a steam connection for the extinguishment of fire and also has its snort valve opening turned down into the chimney draft flue. There are two counterweight blast relief valves on the cold blast line. The by-pass enters the hot blast main at No. 3 stove and is provided with a gate shut-off valve, a McCarthy check valve, and a butterfly regulating valve. This is operated from the cast house, the lever being in proximity to the hot blast temperature indicator.

The stove foundation top and cast-house floor are on the same level. The dust catcher and whirler dust bell platforms, the control valves for water at water seals and washer, the control valves for steam in dust catcher and gas main, the main water supply valves and by-pass, are all operated or accessible from this elevation, thus enabling the general foreman to maintain supervision of stoves, water, dust catcher and washer attendance, and practice with mixer valve, without the deterring handicap of ceaselessly climbing up and down steps. The identical elevation of the stove operating level and the cast house will in the future provide a thoroughfare for foreman and maintenance gangs and material between all three furnaces. The yard is reached by steps midway between the stoves and the furnace, steps at the end stove platform, and steps leading from the stoves and furnaces to the skip house and thence to the bins or yard.

The cast house was laid out with a view to running metal direct to the pig machine while the plant was operating as a merchant furnace but eventually to run to track ladles for delivery to an open hearth mixer when the pig machine will be still available for off-grade and week-end metal. This was worked out by placing a Pittsburgh coal washer double strand casting machine at the bottom of the cast house. Two Pollock short pour ladles (with spare) were placed one at each side of the machine. The ladle furthest off-center

In the Main View of the Accompanying Group Are to Be Seen the Dryer, Washer, Whirler and Dust Catcher, with a Gondola Car Stationed Under the Last Mentioned. Beyond the skip incline is visible the coke breeze elevators, noted also in two other of the illustrations, which elevators are situated at the base of the skip incline. The lower left view shows the coke chutes and breeze screens leading to the skip car. The leaning offset position of the furnace columns, affording room for working about the tuyeres and plates, is noted in the oval view of the base of the furnace





had its pedestal and pouring stand placed in the location of the future track that will bring hot metal cars to the casting machine from all three furnaces. This located the center line of the pig machine from the center line through the cast house and the location of the other ladle with its pouring stand and pedestal. Temporary iron runners were placed to reach the present location of the ladles. Later these runners will be removed and replaced with runners to spouts at the side of the cast house over the same ladles mounted on trucks. The pouring stand will remain at the east side for pouring from track ladles, but its pedestal together with pedestal and pouring stand at the west side of the machine will be removed, thus giving ample room for skulling and relining ladles for three furnaces, together with provision, as at present, for placing scrap and ladle rubbish in cars. The pig machine house is served by a Whiting crane.

The runners have a ⅝ in. fall to the foot and little scrap results. Coke dust, sand, loam and clay are brought to the cast house by a Pawling & Harnischfeger monorail from bins adjacent to a track at the base of the cast house. The monorail also removes cast-house scrap and rubbish, and handles tuyeres and furnace tools.

The equipment of the cast house includes a Berg-Brosius clay gun, which was specified not only as a safety measure but also for the purpose of keeping the blast on the furnace and gas at the boilers to the maximum over costs in view of the heavy outside power load. Only one cinder notch is provided, this being 45 deg. from the iron notch. Cinder is for the most part granulated, and is discharged into a deep pit, which is served by a Pawling & Harnischfeger monorail. Six cars can be spotted under the monorail. A Brosius single line bucket is provided for handling the granulated slag. The cinders may also be run into ladles through spouts which lead to a track adjacent to the cast house.

The shutters are all of the remote control type, and provision has been made for rodding the furnace from the cast house—snort valve wheel, gun control and shutter control all being located as a unit. For purposes of communication duplex signal apparatus connects cast house and stock house, boiler house and power house. Special lighting facilities have been provided and an abundant number of hose connections for both high and low pressure water. Both steam and air are piped to the cast house for use on the gun and for other casual requirements.

Water for the furnace bosh, gas washer, pig machine, cinder pit and miscellaneous uses is supplied through two independent lines from the pump house, with cross connections for emergency use. The circle pipe is fed by duplex feed lines provided with Elliott twin basket strainers. An auxiliary high pressure line is also in proximity to the three-way cocks for blowing out the furnace feed and discharge lines and hot blast valves. High pressure and steam lines are also provided at the top of the furnace.

Although the plans included an ore bridge with a movable car dumper, the necessities of the program compelled deferring its installation. Instead two 30-40 Brown cranes with a 70 ft. boom and a 2-cu. yd. bucket were purchased, to be utilized later on yard work for the completed steel and furnace plant. These are being used with outrigger wheels during the present season for stocking and reclaiming ore. They have proved capable of unloading at a rate of 55 to 60 cars per day, as well as reclaiming ore for bins outside of unloading requirements. Hand labor is, however, required at present for unloading cars. The later installation of an ore bridge will be carried out independent of stocking operations as the necessary ore bridge track rails have been provided on the ore bin back wall and its extension.

Particular attention was paid to the lighting and ventilation of the stock house. Air ducts are located in the central division wall of the bins between the railroad tracks, thus insuring ventilation above the scale cars. A large opening in every vent on either side of the scale car track makes possible a large light storage for spare parts. A 12-ft. concrete base was laid under the car track and the concrete floor encases the wooden ties. The top of the floor is brought flush to the top of the rail on the outside of the track. The concrete between rails is depressed 2 in. and sloped from the center of the track toward the sewer traps.

The bins themselves are of the Rawstorne reinforced concrete type. They have an earth fill and trestle approach on a 2¼ per cent grade. From the scale car to the transfer car rails is 32 ft. There are two tracks, one track serving the coke, limestone and scrap bins and the other the ore bins. These tracks are supported by Bethlehem type girders across the coke bins while at the other bins the track stringers rest on the concrete bin division walls. The ore bins are served by a Brown 50-ton transfer car, into which ore is loaded by the cranes from the stock pile. Each bin has a gross capacity of 200 tons of ore, thus giving 40 to 48 hr. capacity, depending upon the rate of driving of the furnace, and giving flexibility for eight grades of ores and by-products. The double coke bin has a gross capacity of 270 tons of coke, or from 10 to 12 hr. capacity. This capacity is virtually net inasmuch as the bin is free moving in all sections and does not exhibit any dead pockets of coke. The bins are arranged to tie into a continuous system for the future furnace. The bins are lined with cast-iron plates.

The stock house is served by an Atlas hopper scale car, equipped with a dial scale indicator. The bin gates are manually operated by the scale car man and feed from both sides into the car hopper. Coke is drawn direct from the bins to the skip bucket, each skip holding 4500 lb. of coke. A Haven type coke screen is used, obtaining a retarded cascade effect over self-clearing screen openings. Both the slope of each element and the effective area of screen opening may be altered to suit the character of coke. The screenings are handled by DePere automatic skips from hoppers beneath the screens to track hoppers. Provision is made for two bell rod and air actuated coke bin gate operation by the scale car man or by an independent operator. Bell indicators and speaking tube to top are provided, as well as siphon for skip pit. An extra scale car with switch is also provided.

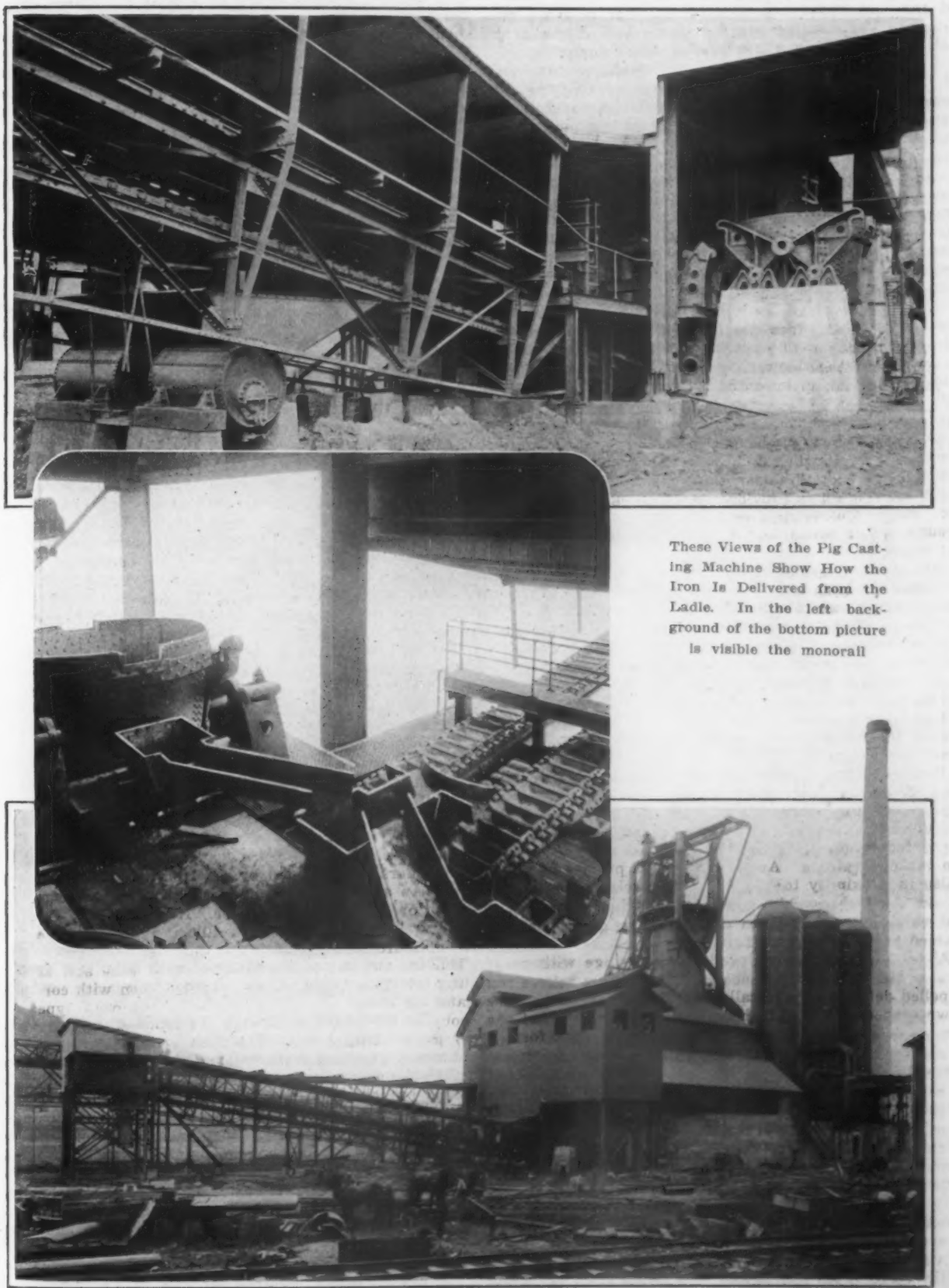
The skip incline is a self-supporting structure of the cantilever type, inclined 60 deg. from the horizontal. It is 171 ft. long with double track for two skip cars of the trailer truck type. The skips are operated by a Lidgerwood direct current electric hoist of the double-drum single-motor type. The motor is a Westinghouse of 200 hp. The hoist has a rope speed of 225 ft. per min. and is designed for an unbalanced load capacity of 20,000 lb. Cutler-Hammer control is supplied. The hoist is located in a concrete and brick house under the skip truss and above the track. This structure also houses the bell cylinders for operating the bells. The cylinders are actuated by air from the cold blast mains. An auxiliary air supply is also provided from the high pressure compressor line. It is automatically admitted through a pressure regulating valve in the event of a drop in the main line pressure.

The boiler house is 200 ft. long, 48 ft. wide and 42 ft. high. It is of brick and steel construction with corrugated steel roof; the monitor is of the open type without sash. All window sash is of steel Truscon type, glazed with factory ribbed glass. There is provided 4800 boiler hp. in units of 600 hp. class M Stirling three-pass boilers, built for 231 lb. pressure and 125 deg. superheat. Seven are gas fired, being equipped with four improved Birkholz-Terbeck burners each. Provision for quick auxiliary coal firing has been made through the equipment of each boiler with Kelly shaking grates. Vulcan soot blowers have been provided throughout and Copes feed water regulators and Foster superheaters.

The eighth boiler is equipped with type E Combustion Engineering Co. stoker and Clarage fan blower. This equipment carries a builders' guaranty of 250 per cent on rating for 4 hr., 200 per cent on rating for 24 hr., and from bank to 200 per cent on rating within 10 min. It was installed to supplement the gas-fired boilers, to eliminate hand firing as much as possible over periods of fluctuating gas supply over cast, and to meet peak loads on the generator. The boilers are

served by a 225-ft. x 12-ft. 6 in. Heine reinforced concrete chimney, connected to the boilers with an overhead breeching of ¼ in. plate, lined with Johns-Manville insulation. Coal storage bins are arranged for the installation of a monorail unloading system and foundations for mechanical ash handling.

The boilers are placed singly, right and left setting, with 6 ft. aisles, and with 15 ft. in front of boilers. Dust from the boiler house gas main is flushed through a trough to the sewer. Approximately 4200 to 4350 boiler hp. "from and at" is realized with gas from the furnace, driving at a 550-ton rate, and credits per ton of pig iron from power from surplus gas are high. This is due both to the high efficiency realized at the boilers where stack temperatures of 550 deg. with carbon dioxide content of waste gases of 23 per cent are averaged, and also to the high Rankin cycle efficiency attained at the blower and turbo-generator due to the high pressure and superheat of steam.



These Views of the Pig Casting Machine Show How the Iron Is Delivered from the Ladle. In the left background of the bottom picture is visible the monorail

Boiler feed water comes from the hot well of the blowing engine condenser at 115 deg. Fahr. with auxiliary supply from the turbo-generator hot well at 95 deg. Fahr., and is put through a Graver combined heater and hot water softener. Chemical treatment is

automatically proportioned. An average feed water temperature of 202 deg. Fahr. from the hot water treater is maintained. Centrifugal boiler feed pumps have been installed, having a capacity of 550 gal. each per min. at the 600-ft. discharge head. Worthington three-stage pumps are used, driven by a Moore non-condensing turbine equipped with a Fischer governor. The exhaust steam goes to the heater. Other exhaust steam goes to the heater from the Clarage fan engine, the blowing engine and turbo-generator condenser air pump and the auxiliary service water pump.

The boiler feed lines are in duplicate to obviate any possible shut-down by failure or clogging, and there is an emergency cross connection to the boiler feed lines from a Knowles reciprocating pump. The boiler house, inclusive of building, gas main, steam and water lines, is laid out to permit expansion to the north with additional gas fired boilers for the additional blast furnaces, and to the south with additional stoker fired boilers. The latter will form a balancing group to carry fluctuating steam demands against a fluctuating gas supply and to supply any deficit between steam demands for the power requirements of the furnace and steel plants and steam available from blast furnace gas.

The steam lines are in duplicate, consisting of a main header with capacity for the entire steam demands of the blower, generator, pumps and auxiliaries. It is supplemented by a parallel header tied in at four points so that in the event of replacement of any fitting on the main header, at least six boilers can be tied to power house and cast house operation. The auxiliary line is of a capacity sufficient to run the blower, the pumps, with some reserve for partial load on the turbo-generator. The main and auxiliary steam headers are carried on brackets on the boiler house columns up to the end of the house. Here they reach the power house through a tunnel, which also carries service and auxiliary service water lines, high pressure water and air lines and electric conduits. The steam lines in the power house are all beneath the floor level.

The main steam header in the boiler house, with its lead to the power house, forms the first element of the eventual boiler plant where the header will expand into a loop system through the boiler and power house with three cross connections and with steam from the waste heat boilers tieing in at the south end. American Ideal steam traps are used.

The power house, which is 180 ft. long, 74 ft. wide, and 28 ft. high, is also of brick and steel. Particular attention was paid to day lighting and ventilation. The monitors in the roof are in every other bay located parallel to the width of the building. The power unit is a 7500-kw., 6600-volt, 3-phase General Electric turbo-generator, which forms the first of four or five of these units to be located in the extension of the power house southward. A 600-kw. motor-generator set furnishes 220 volt direct current for blast furnace purposes. Auxiliary equipment at the turbo-generator includes a Westinghouse Le Blanc barometric condenser and air pump, and a carrier air washer. Swartout exhaust heads and Davis atmospheric relief valves are placed on the atmospheric exhaust line.

The blowing equipment consists of two Mesta high-speed horizontal cross-compound blowing engines, 34 x 72 in., and 84 x 48 in., equipped with Schutte & Koerting emergency stop valves. Iverson valves are used on the air tube.

Seven of the Boilers Are Gas Fired, Being Equipped with Four Improved Birkholz-Terbeck Burners Each. The eighth boiler shown in the foreground is stoker coal-fired only and intended to supplement the other boilers when necessary. The blowing equipment consists of two Mesta high-speed horizontal cross compound engines

The air intake is through the foundation individual to each blowing tub. The tubs are equipped with a common receiver, from which the air is led through a Dyblie non-return valve to the blast line manifold. This connects to the No. 1 furnace cold blast main with blanks for No. 2 and No. 3 furnaces. An auxiliary atmospheric relief blast valve and line is also provided so that the engine can be turned over and warmed up. By closing the atmospheric relief blast valve, with the cold blast valve open the blast is thrown on the furnace and the other engine taken off without juggling with the cold blast valves. The blowing engines are equipped with Schutte-Koerting emergency stop valves and are served by one Alberger condenser and dry air pump, designed for 26½ in. vacuum. The exhaust lines are designed for extension if desired for interconnection with exhaust lines for No. 3 and No. 4 blowing engines, so that any of three operating engines can be operated on three condensers.

Lubrication is taken care of by a Bowser system located in the basement with tanks on the roof truss.

The remaining power house equipment includes an Ingersoll-Rand motor-driven compressor for 300 cu. ft. free air at 100 lb. pressure, a Champion 25-ton crane, and Alberger condenser and air pump.

The initial requirements for water, which is pumped from the river, total 31,000,000 gal. per day. The initial pumping head from the river to the turbo-generator was 175 ft., and the distance pumped was 2700 ft. To conserve on the size of mains and horse-power on pump drive there was worked out and installed a unique system, which involves the delivery of 9700 gal. of water by the river pumps at 175 ft. head, to the coke ovens and the generator condenser. The condenser tail water escapes through a weir into the main supply cistern beneath the pump room floor. The reserve capacity in the cistern is 225,000 gal., sufficient to run the furnace and boilers alone for several hours.

There are three 3200-gal. service water pumps in the basement, two of which are in continuous operation, one pumping to the furnace and one pumping water for miscellaneous uses. The river pumps are Allis-Chalmers with motor drive. The power house pumps are all Alberger, two of the service pumps having Alberger-Curtis turbine drive, and the spare service and the blowing engine condenser pump having Allis-Chalmers motor drive. A Knowles compound duplex pump is provided in the pump basement for emergency and casual high pressure requirements.

The main sub-contractors on the work were the Jack Walsh Construction Co., which had charge of excavations, foundations and fill, including the bins, did all bricklaying, installed the sewers and the 30-in. water line from the river to the power house, and erected the condensing and power house equipment; John Mohr & Sons, who fabricated and erected the plate work; the Lackawanna Bridge Co., which fabricated and erected the structural steel, including the skip incline and the cast house, the boiler house and the power house; B. Floersheim & Co., which installed the piping.

The plans and specifications for the complete plant and plant equipment were drawn up by Freyn, Brassert & Co., engineers, Chicago, who also had supervision of construction. The operating and engineering organization of the Weirton Steel Co., through its executive, J. C. Williams, and its chief engineer of construction, C. H. Hunt, co-operated with the engineers in all details of planning the work, in the purchase and delivery of materials, and in the pushing of work in the field. The work was expedited by the remarkably open winter and, on the other hand, retarded because it was undertaken during the last four months of the war and the following armistice period when delivery of equipment and materials was severely handicapped by priority orders, both at manufacturing plants and on the railways.

Fear German Competition

WASHINGTON, Feb. 10.—Trade Commissioner T. O. Klath reports from Copenhagen that considerable anxiety is felt at present in the Danish iron and porcelain industries concerning the competition of the low-priced German imports in these lines.

"The situation appears to be extremely bad in the iron industry which employs approximately 39,000 laborers," says Mr. Klath. "One prominent manufacturer states that Denmark is at present paying the highest wages of any European country with the possible exception of Norway. The Danish manufacturers who have been exporting a portion of their output are, on account of the high coal prices, the adverse position of the Danish exchange, the high wages and the upset conditions of importing markets, seriously handicapped in the export field. On the other hand, the Danish manufacturers interested in the domestic market are met with the competition of goods imported from Germany at very low prices, in many cases at less than half the cost of production in Denmark.

"It is stated that the German salesmen come to Denmark and examine very closely just how much it costs to produce certain goods in Denmark and then they quote prices to Danish merchants slightly below the Danish production costs—in other words, make the traffic bear as much as possible. The Germans quote prices in kroner."

Advancing Prices in Belgium

BRUSSELS, BELGIUM, Jan. 15.—The course of prices continues to ascend. Quotations in francs per 100 kg. are nominally about as follows, together with equivalents in United States money with exchange figured at about 14 fr. per $1:

Heavy plates	96–105	fr.	(3.05c. per lb.)
Thin plates	130–160	fr.	(4.13c. per lb.)
Heavy rails	85.5	fr.	($60.70 per gross ton)
Light rails	90	fr.	($64.06 " " ")
Ingots	62	fr.	($44.12 " " ")
Billets	70–71	fr.	($49.73 " " ")
Blooms	67.5–68	fr.	($47.54 " " ")
Shapes	80–81	fr.	(2.55c. per lb.)

These prices compare with heavy plates at 95 fr. per 100 kg., medium plates, 105 fr. and shapes and rails 70 fr. on Jan. 1.

Steel plants in Belgium have suffered very much from floods. The Hainaut works are inundated. The railroad station of Chatelineau, an important traffic center, is partly flooded. The electric power station of Montigny sur Sambre has had to stop deliveries of current. The Thy le Chateau plant is likewise shut down and La Providence is isolated, as is also the Zimmerman-Hanrez works, as the employees cannot get to and from work.

The metal working trades of Belgium are agitating for a higher wage, giving as reasons likely to bring about a strike the increases in the cost of living and particularly "the probable advance in the cost of bread."

Americans to Be Represented at Bordeaux Fair

A. D. Straus & Co., 18 Broadway, New York, have been appointed official representatives in the United States of the Bordeaux Annual Fair, which will be held at Bordeaux from June 5 to June 20 inclusive. It is held in the biggest export center of France, at a time of the year when most of the colonial buyers go to France for the purchasing of their annual requirements and is under the patronage of the French Ministries of Commerce and Colonies as well as of the French Chamber of Commerce. The renting spaces are divided into booths, stands, half stands and open space. Special arrangements are under negotiation with the French Line, whereby the exhibits will be carried from New York to the Bordeaux Fair and return at one-half of the tariff rates, and the French Government has authorized all foreign exhibits to be entered "in bond" for the duration of the fair, after which they may either be sold in France upon acquittal of the regular customs duties or returned to their country of origin.

The 39th annual banquet of the Engineers' Society of Western Pennsylvania, Pittsburgh, was held in that city on Monday evening, Jan. 26. The speakers were: A. C. Dinkey, president of the Midvale Steel & Ordnance Co., Brig.-Gen. Edgar Jadwin, U. S. Army, and George E. Roberts, vice-president of the National City Bank of New York. George H. Neilson, president of the Braeburn Steel Co., was toastmaster. E. A. S. Clarke, president Consolidated Steel Corporation, New York, and A. L. Humphrey, president of the Westinghouse Air Brake Co., were at the speakers' table as honor guests. Over 800 engineers and others attended this banquet, which was the largest ever given by the society.

At the annual meeting of the Division of Manufacturers of the Cincinnati Chamber of Commerce, the executive committee submitted a report indorsing the proposed free public employment bureau, to be financed jointly by the Chamber of Commerce and the Division of Manufacturers. The matter will be submitted to the board of directors of the chamber for final action.

BELGIUM'S RECOVERY

Gradual Resumption at Iron and Steel Works Despite Difficulties

WASHINGTON, Feb. 10.—Although present steel production in Belgium is only 17 or 18 per cent of the pre-war output, signs of a gradual return to normal conditions are becoming evident. Trade Commissioner C. E. Herring, who is at Brussels, has just sent a comprehensive report on the Belgian iron and steel industry. He says that if fuel and other raw materials were available in sufficient quantities, from 40 to 50 per cent of the pre-war production might even now be obtained in the restored and undamaged plants. The cost of production, he says, has increased enormously. Labor cost, as in every other Belgian industry, has advanced 100 per cent or more above pre-war levels. Mr. Herring says that when the production of coking coal in France and Germany can be increased and when the railways in France, Luxemburg and Belgium can make prompt deliveries in sufficient quantities, Belgium can again actively compete in the world's markets. The installation of new, thoroughly modern plants to replace those destroyed by the Germans, he points out, will partially compensate for the present period of subnormal production and Belgium will resume her place as one of the leading steel-producing countries of the world. Mr. Herring says in part:

"At present (Dec. 15, 1919) the steel production of Belgium is estimated at 17 or 18 per cent of the pre-war output. If fuel and other raw materials were available in sufficient quantities it is estimated that from 40 to 50 per cent of the pre-war production might even now be obtained in the restored and undamaged plants. The situation has recently been complicated by a railway embargo on iron ore in Lorraine, and there have also been difficulties in obtaining customary supplies of ore from Luxemburg. Furthermore, the installments of industrial coal which Germany is obligated to provide under the peace treaty are said to arrive irregularly, and supplies of industrial coal are difficult to obtain from the Ruhr district on account of transportation and other difficulties. The acute shortage of freight cars and other railway rolling stock on the Belgian railways is another contributing factor.

"In spite of these difficulties, however, it is expected that the present production of about 17 per cent will shortly be augmented because of the lighting of new blast furnaces. The unemployment in the iron and steel industry has been greatly diminished during the last few months, it having been stated that on Oct. 15 about 13,000 operatives were at work as compared with about 24,000 employed in 1914. An indication of the present situation and prospects of the Belgian steel industry is furnished by the well-known Cockerill plant, the largest in Belgium, which was greatly damaged during the war. The director of this plant was recently quoted as saying that for two, and perhaps three, years the large Belgian plants will find it difficult to produce more than 25 per cent of their normal output. Some plants which suffered less under the German occupation are, however, even now producing a considerably greater portion of their pre-war output.

"The cost of production in the iron and steel industry of Belgium has increased enormously. The high prices ruling for ores and fuel, together with the very high prices and exchange premium which must be paid for imports of semi-manufactures necessary for reconstruction, seem to make a steadily rising market inevitable. Another fact is, of course, the increased costs of transportation and uncertainties in receiving materials. As in other Belgian industries, labor costs have advanced 100 per cent and more above the pre-war levels."

The depression in the Swedish iron industry, according to the quarterly report of the Association of Swedish Ironmasters, which has been so marked during the whole of 1918, is growing worse. At the end of October, 1919, only 50 out of 131 furnaces were at work, two fewer than at the end of June.

Exchange Affects Tool Business

TORONTO, Feb. 10.—The high exchange rate between Canada and the United States has made very little difference in so far as the sales of American tools are concerned, but it is gradually beginning to be noticeable that Canadian buyers of tools are turning from American goods to those made in Canada and in Britain, where they are not under the necessity of paying a high premium on American funds. The American manufacturers are, therefore, endeavoring to surmount this exchange difficulty. Many of them are opening accounts with Canadian banks, and depositing in them funds received from customers here, with the intention of leaving the funds in Canada until exchange rights itself. Some of them even contemplate buying Canadian commodities that can be advantageously exported, with these Canadian funds, and collecting in American funds from the export purchaser. One United States firm, which bought $100,000 of Victory bonds, paying thereon $10,000, is now applying Canadian customers' payments on them. If this rule is more largely adopted by the machinery and machine tool manufacturers in the United States who ship their products to Canada, they will have little difficulty in holding their grip on the Canadian market. But where they insist on payment being made in American funds at the prevailing high rate of exchange, which adds upward of 15 per cent to the bills Canadian buyers have to pay, there is sure to be a big decline in their Canadian sales. Even now buyers in the Dominion are giving more attention to Canadian and British made tools, the demand for which is gradually extending.

New Blast Furnace at Natal, Australia

A new blast furnace is being erected at Natal, Newcastle, Australia. It is to be 14 ft. x 65 ft. on eight columns and with seven tuyeres. The hearth level is 9 ft. above the veldt and the ground slopes down to the pig beds at a gradient of 1 in 100 ft. The foundation, 9 ft. deep, rests on solid sandstone. The bins for the ore, lime and coke will be partly underground. A hoist is to lift the charging skips from a level of 16 ft. below the surface to the top of the furnace. The railroad cars carrying materials will be pushed along a siding running on the top of the bins to discharge. There is to be also an inclined skip hoist leading to a stock pile which will be over a tunnel fitted with trap doors at its crown for filling the charging cars below. The iron ore to be used is mostly magnetic and very rich, running between 60 and 65 per cent metallic iron.

It is at first intended to manufacture cast iron pipes and the management is in negotiation for machines working on the centrifugal principle. Another line will be heavy iron and steel castings, using a side-blow converter for making steel, to be followed later by open-hearth furnaces and a heavy 28-in. three-high rolling mill.

Japan Opposed to Bolsheviki

"We shall lock the door tight against the Bolsheviki," stated M. Miyasaki, general agent of the General Fireproofing Co., Youngstown, Ohio, who attended the annual sales conference last week. "We in Japan want freedom and personal liberty but we do not want anarchy. Japan will prove the extreme eastern frontier against the red terror." More than 150 salesmen and dealers attended the gathering. Representatives of the fireproofing or building products department of the company's organization attended. Members of the metal furniture department will meet at Youngstown in March.

The shipbuilding output of the Clyde, England, for 1919 was the largest on record with the one exception of 1913. There were launched 406 vessels of 645,374 gross tons, compared with 440 vessels of 532,094 gross tons in 1918. The yards are estimated to have about one million tons of work on hand which beats all previous records.

Receiving and Delivering Shop Stores

Rules That Insure Accurate Records—Common Faults in Storeskeeping and How to Overcome Them — Shortages

BY H. B. TWYFORD*

AMONG the investments by manufacturers, that for raw materials and supplies may be proportionately a heavy one. It is never unimportant. It is unlike most of the others, because it may fluctuate daily or hourly, due to the continual stream of material going into and out of the stores. It is of great importance, therefore, to have an efficient system of recording all movements of these materials.

The difficulties experienced sometimes with stores records are caused either by the system being too complicated, or because of lack of attention on the part of employees.

Coupled with efficient records is the necessity for accuracy in the manual operations, and orderliness and cleanliness in the storeroom. While some shops may turn out a vast amount of good work under very untidy and seemingly almost chaotic conditions, such a thing is impossible in a storeroom.

Receiving Material

All materials and articles on arrival should be entered in a record, inspected and passed along to the storeroom or to the production department, etc.

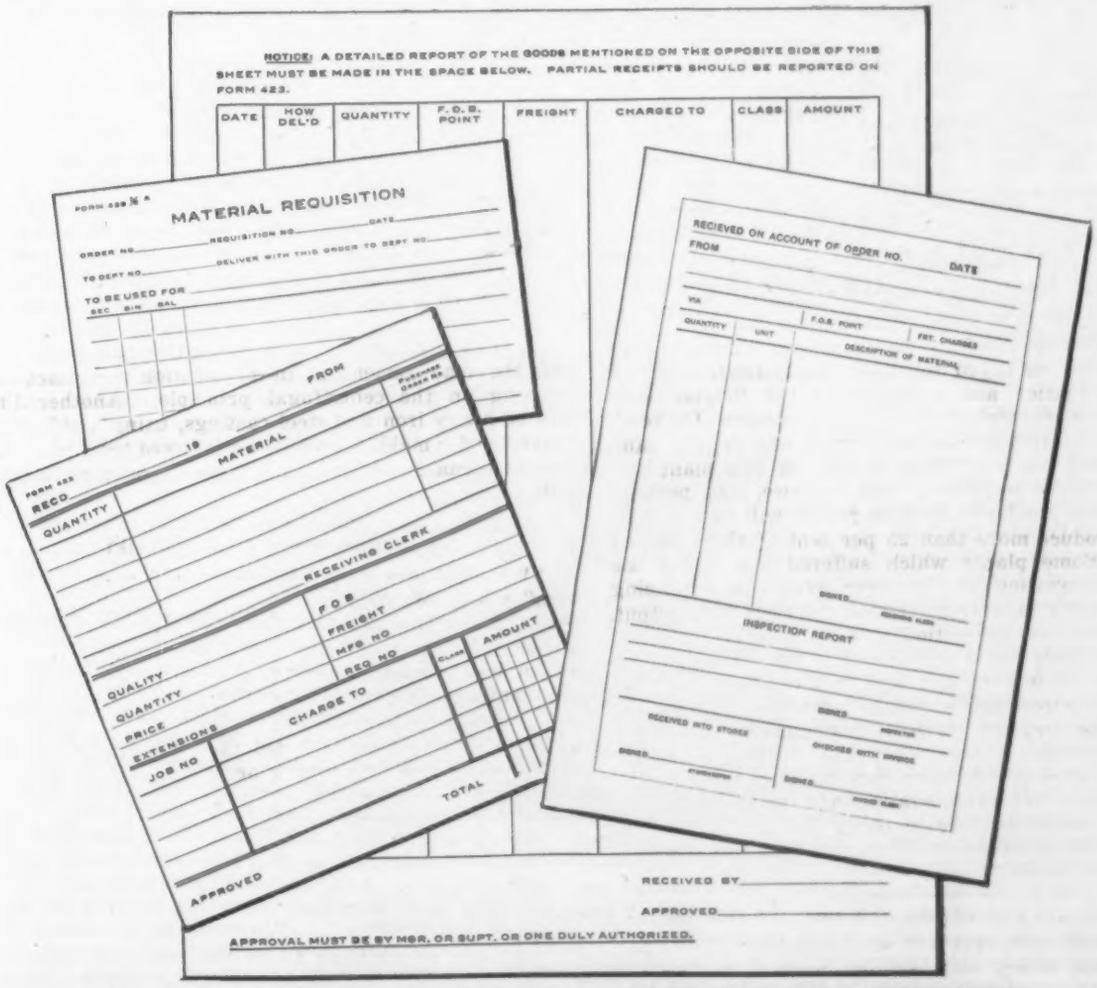
In establishments where the movement of goods is frequent enough to warrant it, it is preferable to separate the activities of receiving, inspecting and storing.

Owing principally to differences in accounting methods some receiving clerks report to the accountants' office, and others to the purchasing department. It is better for them to be independent of any department, because their work brings them into contact with the stores, purchasing and accounting departments, and it is desirable not to have their movements controlled by any one of these departments. They can then serve them all with equal fairness.

The receiving clerk should be furnished a copy of all orders issued. It is contended that if he did not have this information he would more carefully check incoming material; but it is not good policy to keep him in ignorance on this point, because he might receive material in excess of the quantity ordered, or material not ordered at all, or that which had been cancelled. When such occurrences happen it necessitates referring the matter back to the shipper. This frequently results in long negotiations and involves expense in returning the materials, besides the trouble entailed in making the adjustment. In establishments formed on departmental lines it is essential for the receiving clerk to know to which department the material belongs, if it does not go directly into the storeroom.

It is essential for the receiving clerk to make some form of return to either the purchasing or accounting department to enable them to pass the invoices. Several methods are in vogue for doing this. One is to give the

*Purchasing agent, Nichols Copper Co., Laurel Hill, Long Island, N. Y.



Forms Adapted for Stores Records: Fig. 1 (at top)—For Recording Receipts of Material on Reverse Side of Copy of Purchase Order; Fig. 2 (lower left)—Supplementary Form for Recording Receipts of Material; Fig. 3 (right)—Form for Recording Receipt of Material, Inspection of It and Delivery Into Stores; Fig. 4 (upper left).—Requisition for Withdrawal of Stores

receiving clerk a copy of each requisition sent to the purchasing agent. After the order is placed by the purchasing department it notes on the receiving clerk's copy of the requisition the name of the seller and the order number, but not the price, as it is not necessary for him to know this.

This copy bears on the reverse side a form for recording receipt of the material. When properly filled in it is returned to the purchasing or accounting department and attached to the invoice. This scheme has one big defect. Quite often the material specified on a requisition is ordered from more than one concern, or if ordered from one concern is sometimes delivered in installments. There are some establishments where it is used with success, but it cannot be recommended unless the material comes in in one shipment.

Another plan is to furnish the receiving clerk with a copy of the purchase order to be used in a similar manner to the requisition just described. This also bears a form of receipt on the reverse side as illustrated in Fig. 1. This suffers from the defect already noted.

There is, however, a point about this scheme worth consideration. Purchase orders constitute a lot of floating obligations and some companies find it necessary to keep track of them to ascertain when they are closed. This is effected by the accounting department, which receives a copy of the purchase order, and also obtains from the receiving clerk his copy when the receipt on the back is filled in, so giving the accountant information as to purchase obligations when closed.

If an order should be delivered in installments it is necessary to use a supplementary form as shown in Fig. 2 for all deliveries except the last one. When delivery is complete the receiving clerk surrenders his copy of the order. The use of either system necessitates some duplication of work for the receiving clerk, because he must make a record of incoming material anyhow.

The form recommended for recording receipt of material, indicated in Fig. 3, should be in triplicate, and each delivery recorded on a separate sheet. One is kept by the receiving clerk and filed in numerical sequence, which should also be the order of dating. The latter is important, because questions are frequently asked regarding receipt of material and generally the date is given as a reference. The second copy goes to the purchasing department as a notification of the delivery of material. Later it can be attached to the invoice. If this is strictly followed no invoice could ever be paid twice, neither could an invoice be paid for material not received. The third copy follows the material to the inspector, the storeroom or other department.

Inspection and Examination

All materials received must necessarily pass some kind of inspection. The purchase order should specify the nature of the tests or the results which must be obtained from them.

When the seller submits a sample before proceeding to manufacture the bulk of the order, this sample as approved should be properly identified with the order and turned over to the inspector.

Inspection can be done by the receiving clerk, if he has the time and ability, by a member of the stores department, or by an independent inspection department. In any case it should be done promptly after the material arrives, to advise the shipper of any defect without delay, to avoid a shortage due to a sudden call for material for the shop, as well as spot purchases of the required material at a premium.

Any competent man accustomed to handling material can with the exercise of care discover superficial flaws and poor finish, or whether the material has suffered from exposure to atmospheric conditions, or from poor packing or rough handling. He can also detect irregularity in the size of small articles and can make measurements with gages, calipers and micrometers.

Inspection calling for physical tests or chemical analysis, usually by inspecting engineers, requires that test samples, taken from incoming material, be properly marked or tagged with the order number. They should then be sent promptly for testing and the purchasing, technical and stores departments would probably each require a copy of these test results.

Common Faults in Handling Stores

It is of the utmost importance that all material be placed in receptacles assigned to them. If material is allowed to lie around the entrance to the stores, it is not unlikely that when deliveries are being made the material will be taken from there instead of from the regular bin or location, creating confusion and inaccuracies.

Probably the most common form of carelessness is that of permitting delays to occur before placing articles in locations assigned to them. When material is taken out of the bins delays should not be tolerated, because it is usually wanted at once.

All shelves, racks, bins or other receptacles should be numbered and all tiers or sections lettered or numbered. Metal flags can be used to good effect, particularly in numbering the sections or tiers. In addition there should be a card holder on each receptacle containing a card bearing the name of the article. No matter what the article, a name, a size, a weight or a distinguishing characteristic should be inscribed on the card, and this should correspond with the description in the perpetual inventory.

The practice of taking small articles into the stores, approaching the bins where they are supposed to go, extracting one of its contents, matching it up casually with the new articles and dumping the new lot in with the old, cannot be too strongly condemned. The written description of the incoming material should be checked with the written description on the bin ticket.

Deliveries from Storeroom

It is usually important that material and supplies be distributed promptly by the helpers in the stores, particularly in manufacturing plants. The facility with which this is done will depend very largely on the manner in which material has been placed in the racks and bins.

In the majority of storerooms deliveries are much more numerous than receipts. With the larger number of operations there is more liability to make mistakes. The applicants for material must be served accurately and expeditiously, and the transactions must be posted promptly to insure accurate stock records.

Applicants for material should never be permitted within the storeroom. The practice of allowing them to pick out what they need is entirely too common. Many storekeepers compromise by permitting them to go to the shelves and get what they need, checking the weight or count as the applicant passes out. Such methods should not be tolerated. If a loose system prevails, either in receiving or delivering material, the storerooms records cannot be considered reliable.

What a Requisition Should Specify

The requisition must contain certain essential features. These are:

1. The date. This may be stamped on the requisition when received if not already inserted.
2. The name or number of the department from which it originated.
3. An explicit description of material required.
4. For what purpose it is required.
5. It must be signed by a person duly authorized to draw material from the stores.

There are other features which may be necessary in individual cases; these will be governed mainly by accounting and cost-keeping methods. It is preferable, although not imperative, to have a distinguishing color for the requisitions from each department. This assists in segregating and filing. It is also advisable to number requisitions, as they can then be located readily for reference. After being duly entered on the stores records, it is customary for them to pass to the cost accountant. It is possible, therefore, that he might wish the requisitions to be uniform with other documents used in this work.

Requisitions should correspond to the perpetual inventory in specifying quantities. For instance, if the

inventory is kept in units of weight and the requisition asks for a certain number of the articles, it must be converted into units of weight before the articles leave the stores. The bin ticket should indicate in what manner the unit is expressed.

Shortages

Throughout the preceding discussion it has been assumed that the storeroom had the material ready to hand out, but in the case of jobbing orders which may call for odd lots of material and articles seldom called for, it is not to be supposed that they can all be carried in an ordinary storeroom.

When a shortage exists the storekeeper can furnish such material as he has on hand and issue a shortage ticket for that which he cannot supply at once. This shortage ticket should be in duplicate, one copy being retained in the storeroom as a reminder to follow up delivery, the other copy for the shop records.

Overlooking the minimum is, perhaps, the bugbear of a majority of storekeepers. No schemes devised to prevent this are infallible, and most of them simply make more clerical work. Clerks engaged on this work may not balance the accounts frequently, they may have their attention called to other duties, or they may not enter the items promptly and allow this work to accumulate. There must be sufficient clerical assistance on the inventory desk to make postings promptly.

All these auxiliary aids, such as bin tickets and markers, are simply makeshifts for relieving the work on the perpetual inventory; but this inventory is the important work; nothing else can take its place, and it cannot be slurred or neglected.

Perpetual inventories require perpetual attention. lack of attention on the part of employees, or insufficient help, is the only reason for the difficulties some people claim to have with them.

Rules for Storeskeeping

The keeping of accurate records can be covered by the following simple rules:

1. Nothing should be permitted to enter the storeroom unaccompanied by some form of advice, such as the receiving clerk's report, or the credit requisition. These documents are used to make the debit entries.

2. No material shall be allowed to leave the stores without a properly drawn requisition, which should clearly indicate the quantity taken from the storeroom. The requisition should be signed by the recipient of the material.

3. Accuracy in receiving and delivering the quantities specified and accuracy in posting the entries is required.

4. Perpetual inventories shall be treated as cash is treated. Accordingly, it shall be verified frequently.

5. Documents indicating the incomings and outgoings shall be preserved until a physical count is made, in order to uncover any discrepancies.

Fluid Meter for Low Pressure Gas and Air

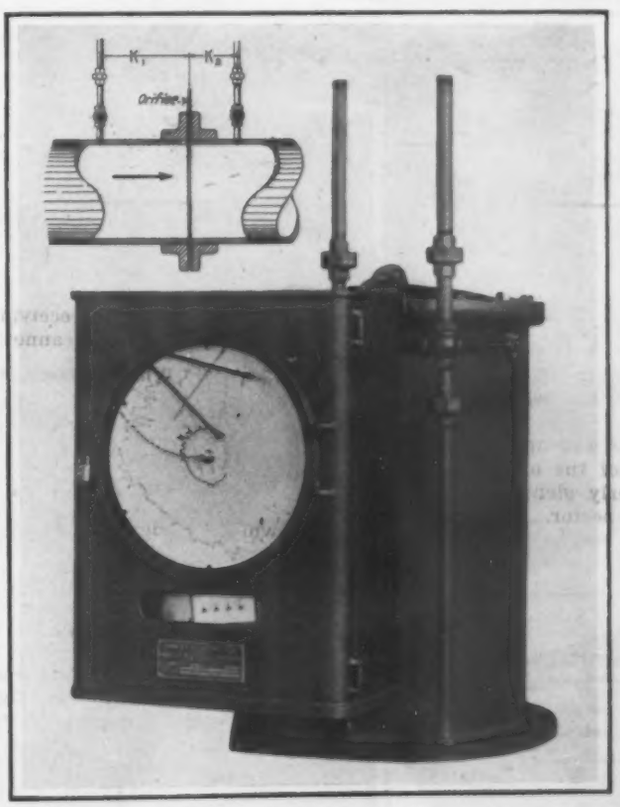
Coke Oven and Blast Furnace Requirements Covered by Pressure Range to 50 Lb. per Sq. In.

A FLUID meter designed for measuring low pressure gas and air is being placed on the market by the Bailey Meter Co., 2015 East Forty-sixth Street, Cleveland. This meter was developed to measure coke oven gas and was first used to meter the surplus gas delivered to the heating furnaces of a steel plant, and later by the U. S. Ordnance Department for controlling certain processes. Among the uses for which the meter has been adapted is measuring crude gas from by-product coke ovens, fuel gas returned for heating, excess gas distributed to boiler house, or for other purposes gas from blast furnaces, supplied to the stoves, boilers, blowing engines, etc., air from blowing engines, cold blast to the stoves and hot blast to the furnaces.

The Standard Meter

The standard meter is designed to operate at any working pressure up to 50 lb. per sq. in., the temperature being limited only by the resisting power of the material available for the orifice. Regardless of pressure and temperature of the gas at the metering point, the meter can be designed to record and integrate flow in cubic feet at any desired standard conditions. Either a pressure or temperature recorder, or both, can be supplied to record on the same chart so that all the conditions governing the supply of gas will be shown. There are three types of pressure recorders, depending on the range of pressure to be measured, as follows:

Type	*Minimum Range*	*Maximum Range*
Oil sealed bell	0- 3 in. water	0-12 in. water
Mercury filled U tube	0- 0.5 lb.	0-10 lb.
Helical tube	0-10 lb.	0-50 lb.



Low-Pressure Gas and Air Meter Which Operates on the Orifice Principle. Less than two per cent error is guaranteed between maximum rating and 25 per cent of rating

A nitrogen filled bulb is used for recording the temperature of the gas up to 600 deg. Fahr., and a modified type for higher temperatures up to 1200 deg.

It is stated that for economically measuring gases in large volume it is necessary to use the flow principle, that is, to produce a pressure difference which varies in a definite known relation to the rate of flow and then to measure accurately this pressure difference in terms of cubic feet of gas at any desired condition of pressure and temperature. Two fundamental principles have been followed to obtain the pressure difference — impact and change in velocity. The impact principle is applied in the Pitot tube and the change in velocity in the Venturi tube and the orifice, the orifice principle being followed in the Bailey meter. The pressure difference produced in both types is caused by the increased velocity and the corresponding change in the static pressure between positions where the stream has different areas.

The general arrangement of the meter is shown in

the accompanying drawing. The orifice can be installed in any convenient flange in the pipe line with the flow in either a horizontal or a vertical plane. In the horizontal installation the orifice may be below or above the recorder. Two ½-in. pipes connect into the pipe line at definite distances, K_1 and K_2 from the orifice, and transmit the pressure difference produced by the orifice to the recorder, which in turn translates this pressure difference into flow, recording the rate of flow on the chart and registering the total flow on the integrator.

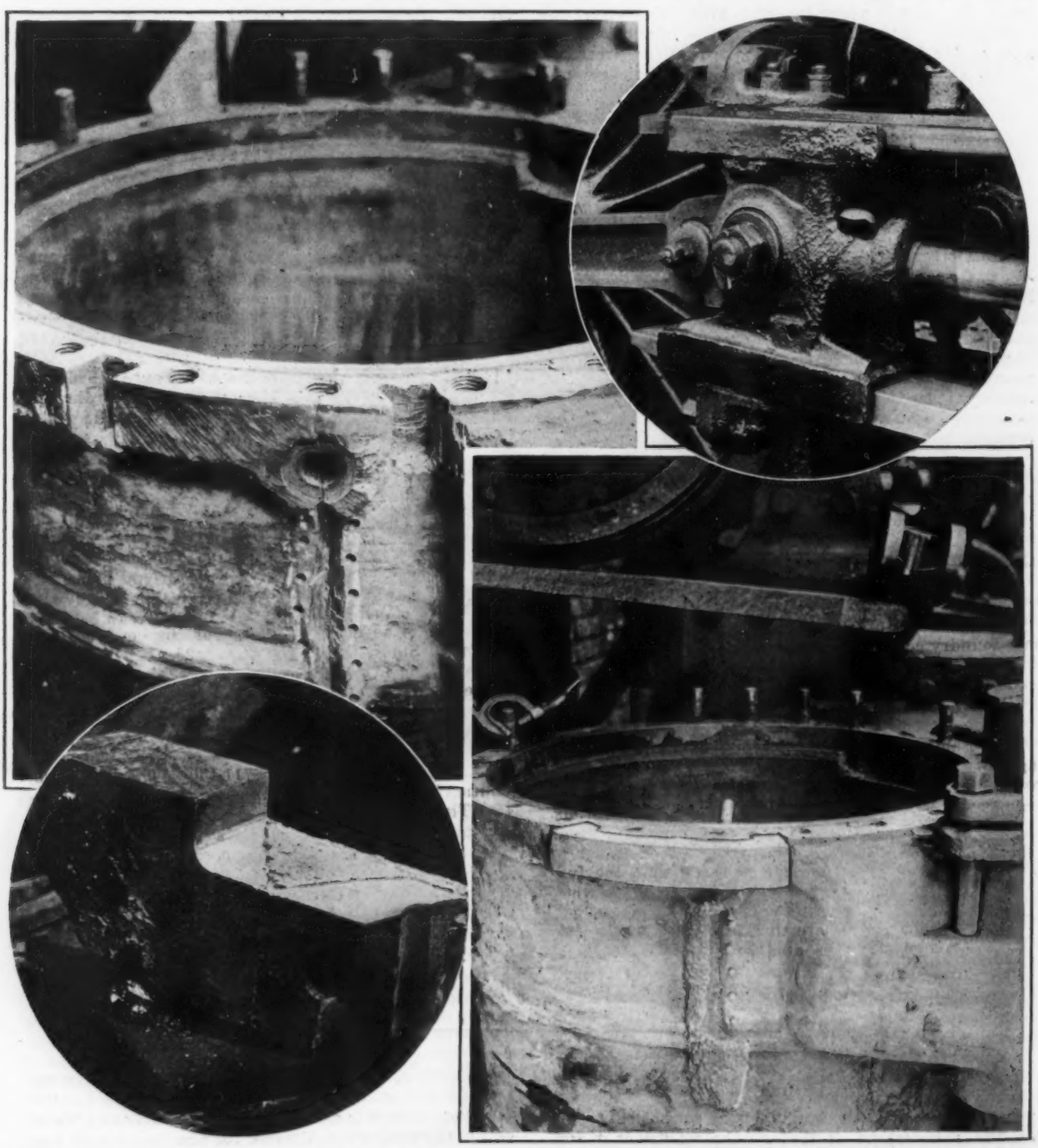
The orifice is of Monel metal, 1/32 in. in thickness for pipe sizes up to 24 in. in diameter, and proportionately thicker for the larger sizes. It is made with an outside diameter that will just fit inside the flange bolts or the bell, of bell and spigot pipe. The section coming between the flanges is corrugated so that it forms its own gasket. This makes it possible to install the orifice in an existing flange and does away with the necessity of changing the piping.

The guarantee on this meter is that between the maximum rating and 25 per cent of rating its error in recording will be less than 2 per cent. Among other advantages claimed for the meter is that the metering element is simple and not subject to wear, there are no moving parts in the pipe and no chance for dust or moisture to accumulate and obstruct the flow, the meter records rate of flow in any desired units on a 12-in. graduated 24-hr. chart, and the same recorder can be used with any number of different orifices either by permanent pipe connections with suitable valve arrangement or by moving the recorder.

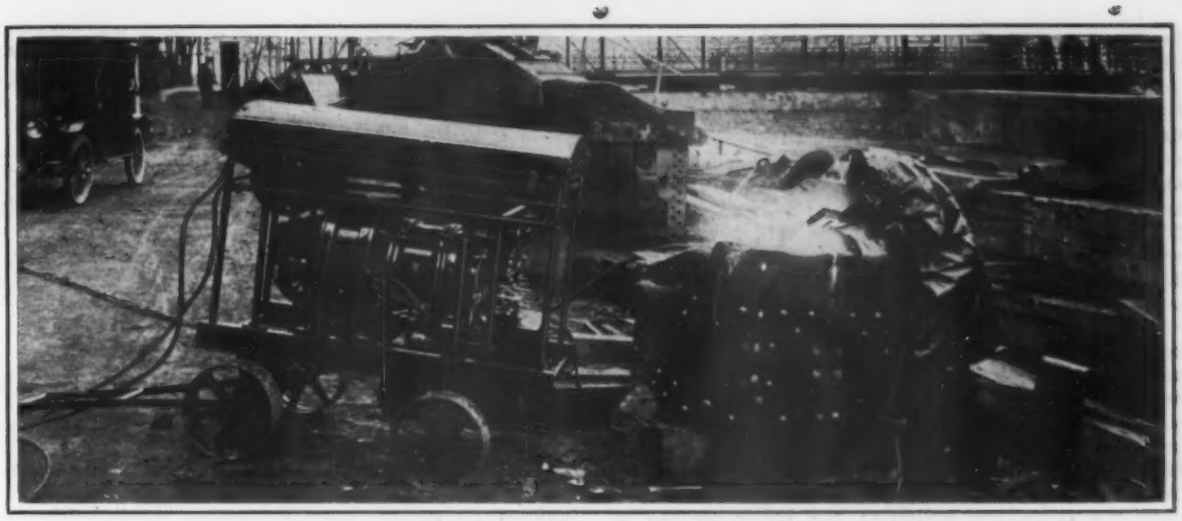
Repairs Made by a Recent New Type of Portable Electric Welder

A description was published in THE IRON AGE, June 12, 1919, p. 1584, of a new portable electric welder put on the market about that time by the United States Light & Heat Co., Niagara Falls, N. Y. Since then it has been put to use commercially in the field and it is believed that the results have proved conclusively that this welder meets the needs of the practical welding operator under almost any condition.

One aim in all portable welders of every type has



Cast-Iron Cylinder Prepared for Repair (upper left) and Partially Welded (lower right); Cast-Steel Crosshead, the Right Side Having Been Welded While in Position (Upper right); Welded Locomotive Frame (Lower left)



Portable Electric Welder Repairing a Manganese Steel Dredge Bucket in the Rain

been to render possible the repairing of important parts without the disassembling of the apparatus or machine. A few of the many cases where the U. S. L. arc welder has been thus used are indicated by the illustrations. It has been in use by the Rock Island railroad and some successful repairs are cited of locomotives where the part was made good without removal from the engine.

In the group of illustrations the case of a broken cast iron cylinder is shown where the fractured part has been prepared for the welder and then the appearance of the weld after having been partially completed. A feature of this is the inserted piece of iron at the top overlapping the crack. Another case is that of a cast steel crosshead, the right side of which has been welded in its position on the locomotive. In the fourth case a locomotive frame has been welded. This broke later in service due to the holes shown which weakened the frame at that point, the new break being outside the rather massive weld.

The illustration which is shown above, is of the portable welder in service when it repaired a manganese steel dredge bucket operating on a branch of the Niagara River at Niagara Falls. It is being operated here on a rainy day, one feature of the machine being that its carrier is so constructed that it can be amply protected in bad weather and still be used without damage to the equipment.

Controversy as to Price of Foundry Coke for Blast Furnaces

WASHINGTON, Feb. 10.—Because of the fact that the Fuel Administration has completely gone out of business, the Government is not expected to attempt to enforce provisions regarding coke prices on which there is any question. The Department of Justice has charge of the enforcement of the rules laid down by the Fuel Administration. However, in view of the fact that there is no agency authorized to give rulings on doubtful points, practices apparently will be permitted which otherwise might be called to account.

Efforts made by numerous interested parties to obtain a Government ruling as to prices of foundry coke sold to blast furnace operators have been fruitless. By an order of July 26, 1918, it was made possible to ship foundry coke to blast furnaces only by special permission of the Fuel Administration. Provision was made that on all coke shipped to blast furnaces in the absence of this permission, the price would be, and now is, $6 a ton, Connellsville ovens. The order issued by the Fuel Administration on Dec. 16, 1919, according to the opinion of some of the officials of the Railroad Administration only reinstated those wartime regulations which related to prices and commissions. It is a mooted question as to whether this latter order does or does not reinstate that portion of the order of July 26, 1918, to prohibit a higher price than the furnace coke level for shipment to blast furnaces when there are no special permits. It is clearly understood in Washington as elsewhere that foundry coke is being shipped to blast furnaces at a price of $7 a ton. It is evident that the Government is not interfering with this practice, and it is altogether unlikely that it will.

All records of the Fuel Administration have been turned over to other departments of the Government. The greater portion of the files have been turned over to the Interior Department. Correspondence addressed to the Fuel Administration reaches the President's new coal commission, which makes no effort to deal with any of the business of the Fuel Administration, but refers such letters as relate to law enforcement to the Department of Justice. Other correspondence is simply placed on file without action. Apparently, President Wilson has no intention of appointing a new Fuel Administrator and present conditions are apt to continue until the coal commission completes its investigation of the wage and price situation. That may be about March 1.

U. S. Steel Pension Fund

The largest distribution since the establishment of the United States Steel and Carnegie Pension Fund, Jan. 1, 1911, was made in 1919 when the amount totaled $733,707, according to the ninth annual report. The recipients were employees who had become permanently or totally incapacitated for vigorous work, and who had been in the services of one of the companies of the United States Steel Corporation 25 years or longer, and were 65 years old in case of males and 55 in case of females. The beneficiaries Jan. 1, 1920, numbered 2940, an increase of 79 over a year before.

The second and third largest years as to amounts distributed were 1917 and 1916 respectively, when the figures were $712,506 and $711,130. The total distribution in the nine years of the fund has been $5,100,815. The average age of the beneficiaries in the nine-year period is 65.64 years, the average service 30.22 years and the average monthly pension $21.55.

The largest pension sum in 1919 of any company was $160,450 of the Carnegie Steel Co., and the largest sum of any works was $35,070, the National works of the National Tube Co.

The fund from which the pensions are made consists of $12,000,000, one-third of which was established by Andrew Carnegie prior to the foundation of the Steel Corporation, the rest of which was set aside by the corporation.

A paper devoted to the interests of its employees has been inaugurated with the January issue by the Petroleum Iron Works Co. and the Pennsylvania Tank Car Co., Sharon, Pa. A name for the publication has not as yet been selected.

Automobile Manufacturing Plans in Western Massachusetts

Development plans of the new western Massachusetts automobile manufacturers are progressing satisfactorily. For instance, the Government officials are holding very close to schedule in removing the large amount of machinery stored in the various buildings of the East Springfield plant of the Whire Wheel Co., to be occupied by the Rolls-Royce Co. of America, Inc. The machinery in the main building is scheduled to be disposed of by the end of February.

It will be some time, however, before the Rolls-Royce Co. begins the manufacture of automobiles. The machinery used in the manufacture of motors in the West during the war is on its way east and part of it, as well as new machine tools, will be installed in the main building as soon as the Government vacates. When this equipment is placed, the management will devote most of its time to the making of dies, etc., while the other six buildings are being cleared of Government property.

The Rolls-Royce management anticipates the initial shipments from mills of steel products, which will have to be sorted, stored, etc., before the plant begins to turn out automobiles, which it is conservatively estimated will be next fall. It is authoritatively stated that there is no truth in the report that the company contemplates the manufacture of a medium-priced car. It will devote itself entirely to a strictly Rolls-Royce product. The company is well covered on its equipment requirements. Most of the new equipment bought is due for delivery in April. It has received a large number of applications from machinists desiring employment when operations begin.

The electric current for the new Stevens-Duryea, Inc., plant at Chicopee was turned on Feb. 2, by the Amherst Power Co. The feed wires provide for 2,200 volts, but transformers will bring this down to 440. Building B is nearly completed, the flooring on more than half of it being down. In this building, which is 300 x 320 ft., approximately 200 machines are already placed. Building A, which is of the same dimensions as building B, has three of its four walls in place. The management expects to have 100 to 150 men employed on machines before March 1.

The company today is employing about 300 machinists at its present location in Chicopee Falls. It is planning to gradually shift operations from here to the new plant as developments warrant, so there will be no interruption in the production schedule. The present schedule calls for a production of 1500 cars in 1920, which will necessitate a gradual increase in the working forces to 1200 to 1500 hands. In 1921, the management expects to employ between 2000 and 2500.

It is planning a rather elaborate construction schedule, which will mature as the business of the corporation warrants. There will be another plant, building C, similar to buildings A and B, as well as a very large body manufacturing plant, service station, power plant, office and administration buildings. No provision has been made for a foundry, however. A contract has been made with the Manufacturers' Foundry Co., Waterbury, Conn., for rough cylinder castings. For the present Stevens-Duryea has production contracts for various other parts, but these will automatically expire as the new plant grows.

Stevens-Duryea, Inc., has a lease of its present quarters which does not expire until 1921. When the new plant is in operation, the present quarters will be used almost exclusively for repair work and as a service station until the new service station is completed. The company's production program calls for but one model, a six cylinder, seven-passenger car and possibly several variations in bodies.

E. E. Nichols, one of the original Stevens-Duryea force and subsequently connected with the Locomobile Co. of America, Bridgeport, Conn., is general superintendent of the new Stevens-Duryea company. George O'Neil, who had charge of the old cylinder department, is general foreman, and George Braithwaite, who was conspicuously connected with the old company, is factory manager. In fact, a very large number of the old Stevens-Duryea employees are working for the new concern. R. S. Derring is president of the company.

Mining Engineers' February Meeting

The American Institute of Mining and Metallurgical Engineers will hold its 121st meeting in New York, Feb. 16 to 19, at the Engineering Societies Building. Besides the usual session on oil, coal, geology there will be the regular steel sessions. These will be held on Wednesday, Feb. 18, the program for which is as follows:

"Blast-furnace Flue Dust," by R. W. H. Atcherson.
"Manufacture of Semi-steel for Shells," by Frank E. Hall.
"An Experiment in One Piece Gun Construction," by P. W. Bridgman.
"Tensile Properties of Boiler Plate at Elevated Temperatures," by H. J. French.
"The Coefficient of Expansion of Alloy Steels," by Dr. John A. Mathews.
"Critical Ranges of Some Commercial Nickel Steels," by Howard Scott.
"Forgeability of Iron-nickel Alloys," by T. D. Yensen.
"Microstructure of Iron and Mild Steel at High Temperatures," by H. S. Rawdon and Howard Scott.
"Physical Changes in Iron and Steel Below the Thermal Critical Range," by Zay Jeffries.
"Graphitization of White Cast Iron," by R. S. Archer.
"Application of the Microscope to the Malleable-Iron Industry," by Enrique Touceda.

The Institute of Metals division on nonferrous metallurgy will meet on Tuesday, Feb. 17.

The regular banquet is scheduled for Tuesday evening and the smoker for Monday evening. Thursday will be devoted to an excursion to the Bush Terminal, Brooklyn.

Engineers' Club of Youngstown

A. L. Moley has been selected house secretary of the Engineers' club of the Youngstown district, membership 600, consisting of engineers, managers of departments and others identified with the manufacturing interests of the Mahoning Valley. Permament quarters have been established in the Park theater building. Aside from its co-operative features, the chief usefulness of the club is in its value to civic life. It has worked with municipal officials in formulating plans for city improvements and has directed particular attention to the Lake Erie-Ohio River canal project.

New officers are: president, W. H. Ramage, assistant chief engineer Brier Hill Steel Co.; vice-president, L. H. Underwood, superintendent coke plant Youngstown Sheet & Tube Co.; directors, one year, E. W. Rosenberger, district manager Johns-Manville Co.; S. R. Clark, superintendent Republic Rubber Corporation; M. W. Cobbledick, chief electrical engineer Republic Iron & Steel Co.; two years, S. G. Hobert, works manager, General Fireproofing Co.; Fred Jeannot, superintendent Shenango Valley Electric Light Co., Sharon, Pa.; Fred Hubbard, chief field engineer Ohio Works, Carnegie Steel Co. Secretary and treasurer are to be appointed.

Scrap Iron Dealers Join Waste Material Association

Due to the considerable number of scrap iron and steel dealers who have recently joined the National Association of Waste Material Dealers, Inc., New York, a scrap iron division is being formed in the association. Heretofore, chiefly non-ferrous metal dealers have been affiliated. The drive for new members for the association, ended Jan. 30, brought in 66 new applications. Among the iron and steel dealers who applied are: A. M. Wood & Co., Inc., Philadelphia; Erie Iron & Steel Co., Erie, Pa.; Girard Iron & Metal Co., Philadelphia; Chester Iron Co., Chester, Pa.; Standard Rail & Steel Co., St. Louis, Mo.; Hyman-Michaels Co., Chicago; Briggs & Turivas, Chicago; Joseph Greenspon's Sons Iron & Steel Co., St. Louis; Sharon-Warren Iron & Metal Co., Sharon, Pa., and the Mann Iron & Steel Co., Norristown, Pa.

Design of Open Hearth Furnaces*

Regenerators and Their Volume in Terms of Furnace Capacity — Importance of Vertical Passages — Period of Reversals

BY A. D. WILLIAMS

REGENERATIVE methods of firing or the preheating of the incoming gases and the air for combustion have made it possible to attain high furnace temperatures. The numerous furnaces utilizing the heat of the products of combustion for the preheating of the gas and air supply are a grand memorial to the Siemens brothers.

In the designing of any furnace with regenerators it is important to have sufficient regenerator capacity and equally important to avoid overdoing the matter. The products of combustion leave the heating chamber of open-hearth furnaces at a temperature of about 1700 deg. The incoming air enters the valve at 10 deg. and the temperature of the producer gas in the main will range from 500 to 600 deg. Coke oven gas, natural gas or any gaseous fuel containing hydrocarbons cannot be passed through a regenerator without a considerable loss in its heating power due to the dissociation of the hydrocarbons. Furnaces fired with these gases, as well as those fired with oils or tars, are designed to preheat the air supply only, but it is usually desirable to design the regenerators for these furnaces in such a manner that producer gas may be substituted without extensive and costly alterations.

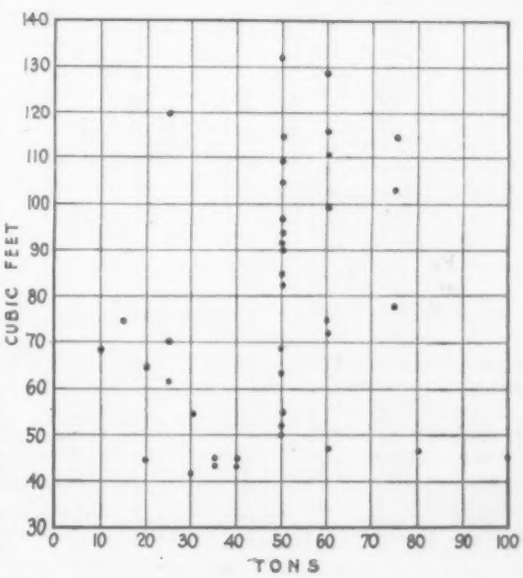


Fig. 17—Graphical Comparison of the Volume of Air Plus Gas Checker Brickwork in Cubic Feet Per Ton of Nominal Capacity for Furnaces of Various Capacities

Volume of Checker Brick

There seems to be a considerable diversity of opinion regarding the amount of checker brick which should be used. Table VIII gives the data covering the volume of the checker brick in a number of furnaces. These data have been plotted in Fig. 17, which compares the total amount of the air and gas checker work per ton of nominal capacity. Table IX gives the maximum and the minimum volumes of checker work.

In all data of this kind there are two uncertain factors. The nominal and the actual capacity of an open-hearth furnace are different. It happens quite frequently that the actual capacity is 10 to 40 per cent in excess of the nominal capacity. When crane and ladle capacity is available this excess can be turned into output, otherwise it may be troublesome. The other uncertain factor is in the checker brickwork itself, the way it is set and its material, the space allowed for the passage of gas and air and thickness of the brick.

A number of more or less empirical rules have been proposed for arriving at the volume of checker or regenerator capacity. A. Consett makes the total regenerator volume 2 cubic meters per ton (70 cu. ft.), and makes the air chamber 10 per cent larger than the gas chamber, for furnaces designed to make four melts per 24 hr. In *Notes et Formules* it is stated that "for slow furnaces the empirical relation between the volume of the regenerator and the charge of the furnace in tons is 0.8 cu. m. (28 cu. ft.) to 1.3 cu. m. (46 cu. ft.) per ton; and for fast working furnaces from 53 to 64 cu. ft. per ton." H. H. Campbell says from 50 to 100 cu. ft. per ton of melting capacity. Gruner says 50 to 70 kg. of checker brick per kilogram of coal burned per reversal. Told suggests 6 cu. m. or 2850 kg. of checker brick per cubic meter of air per second per 100 deg. C. rise in temperature. Another suggestion is the provision of 50 sq. m. (537.5 sq. ft. of checker surface per ton (metric) of coal per 24 hr.

In Euchene's investigations on the carbonizing of coal he developed a formula for the heat storage capacity of checker brick work which may be stated as follows:

$$Q_0^t = 0.20\ t + 0.000062\ t^2$$

In which: Q_0^t = kilogram = calories per kilogram of checker brick between zero and t deg. C.; and in which t = temperature to which the brickwork is raised, deg. C.

Breslauer cites the regenerator data of a number of furnaces, giving the number of cubic meters of regenerator per ton of steel per hour.

His figures are given for a number of different plants as follows:

Cubic Meters of Regenerator Per Ton of Steel Per Hour

Dowaills 14.60	Graz 15.50	Haleside 16.75	
Krupp large..18.32	Landore 20.00	Pateg 20.60	
Krupp 3 ton..36.00	Terre Noire...30.00	Swedish 36.60	
	Borsigwerke...44.00	Steelton, Pa..37.45	

The wide variety of rules for the proportioning of the regenerators affords an ample opportunity for choice, and in part explains the variation in volume of checker work used by different designers. Empirical rules, basing the proportioning of a part by a direct ratio with the capacity of the furnace are very easy to apply, and require very little thought in their use. In addition they save time, as it only takes a few minutes to arrive at the regenerator volume required. Unfortunately, this is not the case when logical methods are employed.

Horizontal or Vertical Passages

Regenerators may be built with the gas passages arranged horizontally or vertically. Where head room is limited a horizontal pass regenerator, at first sight, appears to possess certain advantages, but a consideration of the behavior of heated gases when cooling and of cold gases when being heated, will show that a horizontal regenerator or recuperator introduces a considerable amount of friction in the path of the gases, necessitating an initial pressure for introducing the

*Copyrighted 1920 by A. D. Williams. Other articles by the same author appeared as follows: Jan. 1, on empirical nature of hearth proportions, etc.; Jan. 8, on flow of gases within the furnace; Jan. 29, on ports and roof design.

air and gas and a strong suction to remove the waste gases.

At Steelton, Pa., it was found necessary to use a blower with horizontal regenerators. The writer recently had occasion to investigate the action of some horizontal regenerators. It was found that the products of combustion were flowing mainly through the upper passes and their heat was conveyed to the lower passes by conduction through the brickwork. The air supply flowed through the entire height of the checker. The

"For example, the checker openings of the Cowper hot-blast stove located nearest to the shell lose a great deal of heat by radiation, they therefore exercise a stronger cooling effect upon the current of gas flowing through them and by reason of this the velocity of the descending current of gas is increased, since if $t_2 < t_1$ then $v_2 > v_1$."

Convection currents in gases and air, due to small temperature differences, are by no means inconsiderable. A temperature difference of 1 deg. C. is sufficient

Table VIII. Volume of Checker Brick Ascertained from Practice

Reference Number Ton	Gas Checkers						Air Checkers						Air+Gas
	Length, ft.	Width, ft.	Area, sq. ft.	Volume, cu. ft.	Volume, cu. ft./ton	Hgt., ft.	Length, ft.	Width, ft.	Area, sq. ft.	Vol., cu. ft.	Vol., cu. ft./ton	Hgt., ft.	cu. ft., /ton
10–01–A	....	....	....	297	29.7	....	....	....	....	391	39.1	....	68.8
15–03–B	....	....	....	504	33.6	....	....	....	....	616	41.0	....	74.6
20–03–A	....	....	....	517	25.8	....	....	....	....	780	39.0	....	64.8
20–04–F	7.00	4.00	28.0	240	21.0	....	7.00	4.50	31.5	472	23.6	15.00	44.6
25–03–A	18.00	4.50	81.0	689	27.6	8.5	18.00	6.00	108.0	818	32.7	8.50	60.3
25–04–A	....	....	....	732	29.3	....	....	....	....	1020	40.8	....	70.1
25–05–A	....	....	....	....	....	....	....	....	....	3000	120.0	....	120.0
30–05–A	....	....	....	532	17.7	....	....	....	....	708	23.6	....	41.3
30–04–A	....	....	....	703	23.4	....	....	....	....	937	31.2	....	54.6
35–01–A	12.00	5.58	66.5	665	19.0	10.00	12.00	7.58	90.5	905	25.9	10.00	44.9
35–02–A	12.17	6.33	77.0	656	18.7	8.50	12.17	8.33	101.5	860	24.6	8.50	43.3
40–03–F	15.00	5.29	79.0	734	18.4	9.25	15.00	7.00	105.0	970	24.3	9.25	42.7
40–07–E	8.00	7.00	56.0	840	21.0	15.00	8.00	7.83	63.0	944	23.6	15.00	44.6
50–04–A*	22.00	6.00	132.0	1040	20.8	7.83	22.00	10.00	220.0	1735	34.7	7.83	55.5
50–17–A	....	....	....	930	18.6	....	....	....	....	1590	31.8	....	50.4
50–20–A	25.50	5.50	140.0	1400	28.0	10.00	25.50	8.00	204.0	2040	40.8	10.00	68.8
50–16–A**	22.00	7.92	174.0	1740	34.8	10.00	22.00	10.83	238.0	2380	47.6	10.00	82.4
50–21–F	12.25	9.50	116.0	1070	21.4	9.25	12.25	9.50	116.0	1070	31.4	9.25	62.8
50–07–A	18.25	10.17	185.0	2590	51.8	14.00	18.25	12.00	218.0	3130	62.6	14.00	114.4
50–22–A	18.00	8.17	144.0	2088	41.8	14.50	18.00	12.17	218.0	3160	63.2	14.50	105.0
50–23–A	17.00	10.08	172.0	2093	41.8	12.17	17.00	12.08	203.0	2470	49.4	12.17	91.2
50–09–A	....	....	....	3300	66.0	....	....	....	....	3300	66.0	....	132.0
50–10–A	....	....	....	896	17.9	....	....	....	....	1681	33.6	....	51.5
50–11–A	....	....	....	1936	38.7	....	....	....	....	2904	58.1	....	96.8
50–13–A	....	....	....	1235	24.7	....	....	....	....	1900	38 0	....	62.7
50–16–A**	....	....	....	1912	38.2	....	....	....	....	2621	52.4	....	90.6
50–04–A*	....	....	....	1188	23.7	....	....	....	....	1980	39.6	....	62.3
50–05–A	....	....	....	1928	38.6	....	....	....	....	2310	46.2	....	84.8
50–18–A	....	....	....	1980	39.6	....	....	....	....	2693	53.8	....	93.4
50–19–A	....	....	....	2156	43.1	....	....	....	....	3310	66.2	....	109.3
60–11–A	31.25	7.92	247.0	2510	42.0	10.17	31.25	10.83	340.0	3460	57.7	10.17	99.7
60–13–A	....	....	....	2027	33.8	....	....	....	....	5662	94.4	....	128.2
60–03–A	....	....	....	1953	32.5	....	....	....	....	2393	39.8	....	72.3
60–04–A	....	....	....	1616	26.9	....	....	....	....	2835	47.2	....	74.1
60–05–A	....	....	....	2417	40.3	....	....	....	....	4198	70.0	....	110.3
60–06–A	....	....	....	2515	41.9	....	....	....	....	3443	57.4	....	99.3
60–07–A	24.00	8.4	202.0	2780	46.3	13.83	24.00	12.60	302.0	4160	69.4	13.83	115.7
60–08–B	23.00	8.4	193.0	2630	43.8	13.83	23.00	12.60	290.0	4000	66.7	13.83	110.5
60–14–E	12.00	7.0	84.0	1260	21.0	15.00	12.00	7.83	94.5	1416	23.6	15.00	46.6
75–03–A	....	....	....	2515	33.5	....	....	....	....	3442	44.5	....	78.0
75–02–A	16.00	9.33	149.0	3278	43.7	22.00	16.00	12.50	200.0	4400	58.7	22.00	102.4
75–01–A	....	....	....	3334	44.5	....	....	....	....	5265	70.2	....	114.7
80–01–E	12.50	9.00	112.0	1680	21 0	15.00	12.60	10.00	126.0	1888	24.8	15.00	45.8
100–03–E	14.00	10.00	140.0	2100	21.0	15.00	14.00	11.25	157.5	2360	23.6	15.00	44.6

*Original and Rebuilt.
** " " "

frictional resistance was excessive. These regenerators, however, contained an enormous weight of brick for the amount of work to be done by them, and for that reason gave very little difficulty in operation.

A basic principle of regenerator design is: The gas passages should be vertical; the cooling gas should pass downward through the checkerwork; the gas being heated should pass upward through the checkerwork. When the gases circulate in this manner they have a tendency to subdivide themselves between the different passes proportionally to the local heating and cooling of the brickwork, with the result that the cooling and heating of the gases will be practically uniform. A few years ago A. E. Maccoun made a series of temperature observations on a Cowper hot blast stove at the Edgar Thomson Works (American Iron & Steel Institute meeting, May 28, 1915), which showed that the checker openings close to the shell took more gas when heating and less air on blast.

In his work, *Fours a Flamme*, Prof. Groume-Grjimailo gives a mathematical demonstration of the reason why the portion of the checker work close to the wall, losing a considerable amount of heat by radiation, exerts a greater cooling effect on the hot gases of combustion flowing downward and tends to concentrate their flow through this portion of the checker. While the air, which is being heated, tends to seek the central and for that reason more slowly cooled portion of the checkerwork. It is interesting to note that Prof. Groume-Grjimailo cites the Cowper stove, as follows:

to impress a vertical velocity of 0.268 m. (0.88 ft.) per second on a gas. This velocity will be increased directly as the square root of the difference in temperature. Convection currents will act to carry the cooled gas or the heated gas or air away from the heating or cooling surface. These currents will exist in any chamber, regardless of whether a current of gas is circulating through the chamber or not. When a hot gas is giving up its heat to a surface the convection currents will be downward, while when a cool gas is absorbing heat from a surface the convection currents will be upward. It naturally follows that the working current or circulation of the air or gases should be in the same direction as the convection currents, as in this case they will tend to reduce the friction loss. When the convection currents are in the opposite direction to the working current they form recirculating loops which entail a direct loss of heat capacity in the checkerwork.

Period Between Reversals

The period between reversals has a direct bearing upon the design of the checker in two important particulars: The heating and cooling time determines the weight of checker brick required and the thickness of the brick composing it. There is a limit to the quantity of heat which may be absorbed and given out by the brickwork. The practical limit is reached when the entire mass of brickwork is raised to a temperature at which heating gases pass through the checker with

a very slight or no drop in temperature. The economical limit is reached when the heating gases leave the checkerwork at such a temperature that during the period when the checker is giving up heat the brickwork temperature does not drop below the initial temperature of the incoming gases plus the temperature differential necessary for heat transfer.

The most important variable, the period between reversals, is beyond the control of the designer. The furnaces are operated by two or three shifts of men. Each shift, usually, has certain definite portions of the furnace to keep in repair and will so operate the furnace, when it is possible so to do, in a manner to favor their section and throw the burden of repair work upon the other shifts. This leads to irregular working. Sidney Cornell (*Metallurgical and Chemical Engineering*, May, 1913) cites the case of a 60-ton furnace. There were 509 reversals in a week. The average time period between reversals 10 min. The longest period was 70 min. The shortest 2 min. Consecutive periods differed widely in their duration. The following time periods in minutes were scaled from a diagram he presented:

R 15 R 25 R 20 R 15 R 16 R 23 R 24 R 24 R 34 R 22 R 53 R 12 R 9.

(R stands for reversal.)

Quick reversals are necessary at certain stages of the operation, but it is certainly desirable that the work should be divided, as near equally as possible, between the two ends of the furnace. When the time factor depends entirely upon the human element it is absolutely impossible to avoid considerable irregularity in operation. At the same time melt variations will prevent automatically timed reversals, except during certain stages of the heat.

However, reversing machines are available which will operate the valves in a predetermined sequence and time the reversals regularly. These reversing machines also permit the operator to reverse the furnace at any time he sees fit. Machines of this type have been installed at a number of by-product coke oven plants, but there seems to be a tendency upon the part of the "heaters" to cut out the automatic timing device.

Table IX—Maximum and Minimum Volume of Checker Brick Ascertained from Practice

Capacity, Tons.	Gas		Air		Air + Gas	
	Min.	Max.	Min.	Max.	Min.	Max.
10	29.7	...	39.1	...	68.8	...
15	33.6	...	41.0	...	74.6	...
20	21.0	25.8	23.6	39.0	44.6	64.8
25	27.6	29.3	32.7	40.8	60.3	70.1
30	17.7	23.4	23.6	31.2	41.3	54.6
35	18.7	19.0	24.6	25.9	43.3	44.9
40	18.4	21.0	23.6	24.3	42.7	44.6
50	17.9	66.0	31.4	66.0	50.4	132.0
60	21.0	46.3	23.6	94.4	44.6	128.2
75	33.5	44.5	44.5	70.2	78.0	114.7
80	21.0	...	24.8	...	45.8	...
100	21.0	...	23.6	...	44.6	...

It is hardly necessary to state that a certain amount of passive or impassive opposition might be expected to the use of a machine of this kind, a species of sabotage which is extremely difficult to overcome. Under ordinary working conditions there should be two to eight reversals per hour, and it is necessary to proportion the checkerwork to suit the longest time period.

(*To be continued*)

The Railroad Return Bill

WASHINGTON, Feb. 10.—The chances of extension of Government control over the railroads beyond March 1 now appear to be nil. The agreement by the conferees of the Senate and House on the railroad bill is expected to mean the enactment of legislation prior to March 1, when the roads may be returned to private control under the executive order already issued.

The bill as agreed upon by the conferees provides for a 5½ per cent average return on railroad investment for two years, after which the Interstate Commerce Commission is given authority to change the percentage. Excess earnings over 6 per cent are equally divided between the railroads and the Government, which will use this fund in loans to weaker roads.

There is no anti-strike provision in the bill. A compromise on the wage adjustment section provides for a board of five members appointed by the President which will act on cases which are not settled by adjustment boards made up of an equal number of representatives of the carriers and employees. Organized labor is expected to find fault with this provision but there seems no possibility that labor can prevent the approval of the conferees' report by both houses.

The standard return which has been in effect during the war will be guaranteed by the Government for a period of six months, the Government agreeing to pay deficits up to that time. The bill greatly increases the authority of the Interstate Commerce Commission.

Heavy Demand for Tin Plate

WASHINGTON, Feb. 10.—Trade Commissioner Wilbur J. Page, reviewing the British tin plate market situation, reports to the Bureau of Foreign and Domestic Commerce that the domestic and foreign demand for tin plate is very large.

"Supplies of tinned hollow-ware are coming in fairly well, but the fear of a continuance of the labor troubles in the South Wales mills is hardening prices," said Mr. Page. "This fear is grounded on the recent strike of the picklers and helpers engaged in the manufacture of tin plates. It is encouraging to note, however, that in several of the factories they have already resumed work. The domestic and foreign demand for tin plates is larger than ever."

Chicago Pneumatic Tool Co. Conference

The Chicago Pneumatic Tool Co. on Jan. 21 and 22 held a general conference of executives, plant and branch managers and salesmen at its Detroit plant, Second Avenue and Amsterdam Street, on the occasion of the formal opening of a large five-story addition. The expansion program for 1920 was outlined, calling for largely increased production at Detroit and at the five other American plants of the company. Much of the proposed increase in production is already absorbed by orders for future deliveries. The nation-wide chain of service stations which the company has opened and supplied with complete stocks of spare parts, machinery and tools and provided also with facilities for handling territorial repairs for users of the company products, was also outlined.

DeForest Works Additions

Initial operations are being started on construction of additional units to the DeForest works at Niles, Ohio, of the Republic Iron & Steel Co. The Alliance Machine Co., Alliance, Ohio, has been given a contract to supply 32 housings, each weighing 34,000 lb. of cast steel, for eight sheet mills. With this installation the Republic company will have 18 sheet units at the DeForest plant. The new mills will be built in two units, each having four stands of roughing and finishing rolls. The mills will be electrically driven and 1200 hp. motors will be installed. Roughing stands will be equipped with rolls of the balanced type and with motor-driven screwdowns.

Reduction in operation of the Steelton, Pa., plant of the Bethlehem Steel Co. by more than 50 per cent has been necessitated by reason of the acute coal shortage. The mills closed on Saturday with the expectation of early resumption in operation.

Effect of Sulphur on Steel Castings*

Unimportance of a Slight Increase—Chief Factors Affecting Quality—Role of Annealing and Furnace Practice

BY PROF. A. E. WHITE.

CONSIDERABLE has been written concerning the effect of sulphur in steel. Numerous writers have pointed out that sulphur in percentages much above 0.04 or 0.05 gives material showing undesirable qualities. Now and then some one suggests that sulphur in percentages greater than 0.04 or 0.05, possibly as high as twice the values given, in no way affects the quality of the steel.

Much that has been written is in the way of exposition and is not supported with evidence. Furthermore, a considerable amount of the evidence submitted is so beclouded by other factors that the data are valueless. Practically all of the literature discussing sulphur deals with its influence in rolled or forged steel and not in cast steel. Between cast steel on the one hand and rolled or forged steel on the other, there is, in the writer's opinion, a vast deal of difference. Therefore the observations on the influence of sulphur in rolled or forged steel, relatively speaking, may have little bearing if applied to cast steel. This, briefly stated, is the status of the question at the present time.

Chief Factors Affecting Quality

Broadly speaking, there are five main factors which affect the quality of steel castings: Design of castings, composition, molding practice, steelmaking practice and annealing practice.

Included in the molding practice may be listed the kind of mold, whether of green or dry sand; method of venting; weight and location of riser; method of grating; character of cores; length of time mold is kept around metal after pouring, etc.

In the steelmaking practice may be included place of recarbonization, whether in furnace, converter or ladle; size of heat; number of castings to be poured from a given ladle; temperature of pouring, etc.

In the annealing practice may be included the evenness of furnace temperature; the temperature employed; the time consumed in bringing to heat; the time at heat; the time consumed in cooling; the type of castings placed in a given furnace, whether all light, all heavy, or mixed; the type of furnace used, whether a furnace designed for heavy castings employed on light ones or vice versa; character of flame, whether oxidizing, reducing or neutral, etc.

There are times when too little attention is given to the question of design of steel castings. Many designs are made by men who know too little about the characteristics of metal when it is changing from a liquid to a solid. Much improvement in the matter of quality of finished castings could be brought about by closer co-operation between the designer and foundryman.

Importance of Annealing

The writer believes much greater attention should be given to the matter of annealing than has been accorded it in the past. As a rule, steel founders have not awakened to the latent possibilities of scientifically controlled annealing. Many furnaces bear indications that the only things thought of in their design are walls, a floor, a roof, and some kind of ports for the admission of heat.

There seems to be an utter disregard of such questions as fuel efficiency, through proper combustion and control of heat losses by radiation and by the stack; character of the flame, whether oxidizing, reducing or neutral; scientific temperature control, for in most furnaces there is as much as 200 deg. Fahr. difference in temperature in different portions of the same furnace; accurate temperature measurements, for such furnaces as have pyrometers usually have only one and it is neither frequently calibrated nor does it necessarily record the real conditions in the furnace because of the varying temperature distribution in the same; and care in the selection of only pieces of approximately the same cross section for each furnace per anneal, for there exists a more or less haphazard method of placing castings with different cross sections in the same furnace with the resultant of either overheating the thin ones or failing to remove the dentritic structure in the thick ones.

It was the writer's privilege in the fall of 1916 and the winter of 1916-1917 to visit nearly all of the important steel casting plants in the eastern half of the United States. It was also his privilege to have under his supervision the inspection of all of the steel casting plants producing ordnance material for the United States army from January, 1918, until he left the service in March, 1919. As a result of this experience, he has come to feel to a greater and greater extent that the acceptance of steel castings should be placed on a broad basis and that the minute scrutiny of castings for a few hundredths of a per cent of sulphur is both irrational and unwise.

To talk about the effect of an increase of 0.01 or 0.02 per cent of sulphur when by improper annealing, improper steelmaking or by improper foundry practice properties many times worse than those produced by sulphur are acquired by the steel, is, in the writer's judgment, placing undue emphasis on the wrong factor.

Sulphur in steel may increase blow-holes—it is granted that this is a disputed point—but assuming that it does, it will not do so to nearly the same extent as an improper temper to the mold; improper venting of the mold or core, especially the core, or an improper pouring temperature. It may increase shrinkage, but it will not do it nearly as much as an improper casting design, an improper pouring temperature, or too rapid a heating or cooling during the annealing. It may decrease the metal's resistance to shock, but not to the degree that a poorly designed casting will, or one in which the metal has been overheated, burned or underannealed with the dendritic structure still in evidence.

It was because of the feelings expressed in the preceding paragraph that the writer championed, while connected with the ordnance department, a more liberal specification as applied to sulphur, though accompanied at the same time with such a method of inspection at the casting plant consisting of an examination of test bars, annealing lugs, visual examination, etc., that the real quality of the castings, or as near real as could be obtained, might be ascertained.

Discussion of the Paper

The discussion of Professor White's paper was one of the interesting ones during the Foundrymen's convention last October in Philadelphia. Some of the chief points brought out were as follows:

R. A. Bull, Duquesne Steel Foundry, Coraopolis, Pa., who was chairman of meeting, opened the discussion by emphasizing the special interest and importance of this subject and recalled that at the last meeting of the American Society of Testing Materials, the committee on steel had announced that it would make an extensive investigation of sulphur and phosphorus in steel castings, the United States Bureau of Standards co-operating.

J. Turner Moore, president Reading Steel Casting

*From a paper presented at the American Foundrymen's Convention in Philadelphia in October, 1919. The author is professor of metallurgy, University of Michigan, Ann Arbor, Mich.

Co., Reading, Pa., called attention to the fact that the Steel Foundrymen's Association of America has a committee on this subject and that there is liable to be a great tendency to duplication of effort. Mr. McCauley, who is a member of the latter committee, said that no tests have thus far proved that 0.06 per cent of sulphur is injurious and that castings, varying from 0.042 to 0.07 per cent sulphur had checked as well as castings with sulphur and phosphorus as low as 0.08 per cent so that no conclusions were possible.

Attention was called to the fact by Edwin F. Cone, associate editor, THE IRON AGE, New York, that during the war various specifications were changed as to sulphur to enable maximum output of needed products and he asked whether Colonel White had any concrete data as to any harm from the increased content of sulphur in castings in general. In reply Professor White stated that so far as he could ascertain castings with higher sulphur content were giving as good service as those under 0.04 per cent sulphur—that there was no evidence that increased sulphur did any harm.

Commander Rhodes of the United States Navy testified that sulphur and phosphorus in steel castings was a serious matter, so much so that in the U. S. S. Georgia several castings in 14 mounts broke and had to be replaced. They were found to contain 0.06 per cent sulphur, whereas those as low as 0.04 per cent had never broken. The subject of large ferrite areas or ghosts in castings was also alluded to by Commander Rhodes as perhaps due to the sulphur and phosphorus content.

Colonel White rejoined that it was generally recognized that phosphorus was a large factor in the production of ferrite areas or ghosts in that it prevents the pure iron or ferrite from distributing itself. E. F. Cone called attention to the testimony of Dr. Henry M. Howe at the last meeting in Chicago, the week before, of the American Institute of Mining and Metallurgical Engineers when discussing John H. Hall's paper on the annealing of steel castings. Dr. Howe said that both phosphorus and oxygen were the factors making ferrite lines or ghosts in steel castings. Mr. Cone regarded this testimony of the leading metallurgist of the country as a convincing answer to any question on this subject.

C. S. Koch, president Fort Pitt Steel Casting Co., McKeesport, Pa., made the statement that annealing was a most important factor in steel foundry practice and that most of the trouble during the war in the ordnance department could be laid directly to annealing and equipment therefor.

C. A. Messinger, Sivyer Steel Casting Co., Milwaukee, Wis., made the statement that members of the American Foundrymen's Association do not appreciate what makers of malleable castings are doing by means of their association and the research work they are conducting. As a result the properties of their product have been greatly enhanced, the tensile strength having been increased from 38,000 lb. per sq. in. to as high as 56,000 to 58,000 lb. per sq. in., and also that malleable castings were in not a few cases competing and replacing steel castings.

PIG IRON FROM SCRAP STEEL

Made in Cupola With Ferrosilicon—Turned Into Castings Also in Converter

The following experiments were tried in a Canadian steel foundry, where the supply of pig iron suitable for the making of steel castings from the converter was suddenly cut off, says a writer in the *Journal* of the West Scotland Iron and Steel Institute. The first trial was made with one ton of steel scrap, consisting of plate cuttings and shell ends, charged into the cupola with some ferrosilicon after the regular day's run had been melted down. The metal came down quickly and was perfectly fluid and hot enough to be carried away in shank ladles for sand casting. It was not possible to ascertain the yield in this case, but later runs gave an average of 90 per cent; recovery, including the weight of ferrosilicon added. The analysis of the artificial pig thus produced is quoted in the table as No. 1.

The second test as made in a 3-ft. cupola in the iron foundry, six tons of steel scrap, made up equally of plate cuttings and shell scrap, being melted with 130 lb. of ferrosilicon per ton. The coke used was low in sulphur, 0.64 per cent, and the large melting ratio of 5 to 1 was adopted as it was judged that this would be needed to offset the liability of the light scrap to oxidize in the blast and also to give it every chance to absorb sufficient carbon. About 2 per cent of limestone was used as flux and this gave a fairly fluid slag. The metal melted down quickly and was quite hot enough for shank pouring, only as the carbon was rather low some skulls were formed in the ladles. The metal, as cast in sand into pigs of about 180 lb. each, was close grained in fracture, free from blow-holes but high in shrinkage. (See analysis No. 2.)

Two other runs of about eight tons were run with good results, the last of which was poured from a large ladle by the aid of a crane, thus saving considerable labor. One analysis of this metal showed silicon as low as 2.45 per cent, and one as high as 3.11 per cent, the average being as shown in analysis No. 3. The slightly higher phosphorus content was due to about 40 per cent of the charge being made up of home scrap with 0.06 per cent phosphorus which was melted in with the plate and shell scrap. The silicon thus absorbed from the ferrosilicon was over 70 per cent of that charged. The ferrosilicon was added as lump in the cupola to the extent of 60 per cent, the remainder being added as powder in the ladle. About 18 tons of this artificial pig was melted with equal parts of steel scrap and converted into steel with complete success.

The next step was to convert the pig as soon as it was melted instead of casting and remelting. The first attempt to do this was made with 5000 lb. steel scrap, and 250 lb. ferrosilicon was charged into the cupola to make a final blow for the day. This metal gave the hottest converter full of metal in the day's run, silicon absorption being 77 per cent of that charged and the steel resulting containing combined carbon 1.78 per cent, manganese 0.82 per cent, sulphur 0.044 per cent and phosphorus 0.073 per cent. Since this initial success, the final two blows of each day's run have been made direct from steel scrap and ferrosilicon only, and all have yielded excellent castings. The amount of ferrosilicon used to make the artificial iron has been constantly reduced until it has now attained a minimum of about 160 lbs. of ferrosilicon per converter charge of 4500 lbs.

The saving which has been effected by thus making pig from scrap steel, instead of buying pig iron at present prices, has amounted to nearly one penny per pound of metal in the ladle. If the scrap is blown direct after melting with ferrosilicon the saving is 1½d. This second method has also the advantage that the pig has only one opportunity of taking up sulphur from the coke. Naturally the whole success of the process has been due to the use of the initially hot cupola and converter, coupled with the plentiful supply of good coke and of lump ferrosilicon, the latter preferably of the 50 per cent variety.

	Cast Pig No. 1, Per Cent	Cast Pig No. 2, Per Cent	Fluid Pig No. 3, Per Cent
Silicon	2.53	2.73	2.77
Managanese	0.42	0.37	0.37
Sulphur	0.053	0.053	0.051
Phosphorus	0.042	0.039	0.059
Combined carbon	0.42	1.65	1.41
Graphitic carbon	1.23	0.91	1.00
Total carbon	1.65	2.55	2.41

The technical night school of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has announced its 1920 program, including courses in machine-shop practice, blueprint reading, shop drawing, machine design, shop mathematics, practical electricity, shop mechanics; officers courses in business English, typewriting, and office training; as well as a course in hygiene and health for wives of the employees.

Exports and Imports of Steel Decrease

Conditions Unfavorable for Foreign Commerce Reflected in Statistics for December—Exports for Year Also Decline

WASHINGTON, Feb. 9.—A considerable slump in both exports and imports of iron and steel took place in December. Exports of manufactures of iron and steel were much less both in value and tonnage than for a number of months. Imports reached a lower level than for some time. Exports appear to have felt the effects of decreased production due to the steel strike and other causes, and adverse foreign exchange conditions making it difficult to finance European purchases.

The value of exports of manufactures of iron and steel during the calendar year 1919 was somewhat less than in 1918 or 1917. The tonnage similarly totaled a smaller amount. Exports of machinery, however, were greater in 1919 than in 1918. The increase in exports of machinery reflects the demand for the rehabilitation of European industries. Imports during 1919 jumped considerably over the figures of 1918.

Exports, 1919—January to December

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Total	4,239,837	309,682	258,907

Iron and steel manufactures exported in December totaled $60,399,425 in value as against $74,676,004 in November, $76,172,791 in October and $73,378,468 in September. In December, 1918, the total value was $75,133,890. The decrease in December below the average of preceding months and the same month of the previous year was approximately 20 per cent. Exports of manufactures for the calendar year 1919 were valued at $969,273,732 as against $1,035,299,567 in 1918 and $1,241,960,102 in 1917.

The December exports of manufactures totaled 254,676 gross tons as against 295,045 gross tons in November, 302,456 in October and 363,505 in September. The 1919 total was 4,386,201 gross tons. In 1918 a total of 5,338,037 gross tons was exported. In December, 1918, the total was 357,703 gross tons.

Imports of Iron and Steel

	December		Calendar Year	
	1918 Gross tons	1919 Gross tons	1918 Gross tons	1919 Gross tons
Ferromanganese	177	3,427	27,168	33,022
Ferrosilicon	1,463	1,822	5,540	10,445
All other pig iron	30	7,528	2,003	58,198
Scrap	20,304	20,218	63,730	177,293
Bar iron	48	366	1,469	1,940
Structural iron and steel	112	196	2,604	1,154
Steel billets without alloys	2,595	2,878	33,835	8,230
All other steel billets	1,040	1,637	8,038	8,038
Steel rails	1,875	1,272	8,705	17,008
Sheets and plates	60	90	1,546	1,095
Tin and terne plates	....	17	32	241
Tin scrap	741	239	6,692	5,255
Wire rods	....	107	7,677	342
Total	28,445	39,797	179,702	322,261
Manganese, oxide and ore of	21,424	36,376	491,308	333,344

Total exports of pig iron in December amounted to 14,612 gross tons. In November the total was 21,429 gross tons. In December, 1918, the total was 24,577. The 1919 total was 321,342 gross tons, while in 1918 the total was 269,527.

Exports of billets, blooms and ingots were greater in December than in November, when a slump occurred in this particular group. The total in December was 21,538 gross tons as against 13,211 in November. The December total was only slightly above the October total, however, which was 20,713 gross tons and was much less than the September total of 37,513 gross tons. Included in the December exports were 7515 gross tons to Italy, and 9901 gross tons to the United Kingdom.

Practically the entire decrease in exports of manufactures of iron and steel in 1919 from 1918 is accounted for in the item of billets, blooms and ingots, the drop being due presumably to peace conditions and the cutting off of the enormous demand for munitions of war. The total exports of billets, blooms and ingots in 1919 amounted to 258,424 gross tons as against 1,789,189 in 1918. Of the 1919 exports 105,075 gross tons went to the United Kingdom, 77,275 to France and 50,524 to Italy. In 1918 680,248 gross tons were exported to France, 647,115 to the United Kingdom and 209,860 to Italy.

Exports of steel rails slumped in December, along with other things. The total was 34,149 gross tons as compared with 54,342 in November. In December, 1918, the total was 44,982 gross tons. Exports of steel rails in December, 1919, included a small item of 431 tons to France. In December, 1918, 25,413 tons of rails were shipped to France. The 1919 exports of rails included 141,261 tons to France as against 172,331 tons to the same country in 1918. Canada got 66,558 tons in 1919, but only 25,380 tons in 1918.

Exports of Iron and Steel

	December		Calendar Year	
	1918 Gross tons	1919 Gross tons	1918 Gross tons	1919 Gross tons
Ferromanganese	11	3	3,577	2,999
Ferrosilicon	472	146	4,107	4,943
All other pig iron	24,094	14,463	261,843	313,319
Scrap	31	3,472	2,160	26,775
Bar iron	10,167	1,776	63,327	60,546
Wire rods	11,749	6,868	149,522	118,009
Steel bars	39,002	30,258	579,149	554,211
Billets, blooms, ingots, n. e. s.	63,890	21,538	1,789,189	258,424
Bolts and nuts	3,231	2,346	26,327	30,813
Hoops and bands	3,800	3,708	50,781	50,835
Horseshoes	99	268	2,767	3,384
Cut nails	252	84	3,824	2,920
Wire nails	5,717	3,186	78,727	89,778
All other nails, including tacks	958	798	11,788	16,229
Cast-iron pipes and fittings	1,708	4,276	55,966	39,455
Wrought iron pipes and fittings	7,991	11,602	89,976	236,080
Radiators and cast-iron house-heating boilers	461	650	2,861	4,657
Railroad spikes	763	920	10,057	20,306
Steel rails	44,982	34,149	453,566	652,449
Galvanized iron sheets and plates	3,997	6,011	68,739	101,638
All other iron sheets and plates	1,858	1,816	40,756	39,894
Steel plates	62,591	46,746	551,565	710,012
Steel sheets	10,128	8,148	163,420	177,466
Ship and tank plates, punched and shaped	11,109	2,300	29,722	14,187
Structural iron and steel	28,045	15,610	232,714	360,787
Tin and terne plates	14,641	15,375	222,448	204,524
Barb wire	4,043	10,157	235,082	101,450
All other wire	11,913	8,002	157,275	190,111
Total	357,703	254,676	5,338,037	4,386,201

Exports of steel plates were less in December than in November, but more than in October. The total in December was 46,746 gross tons as against 63,684 in November and 40,660 in October. France got 2344 gross tons in December, 1918, but only 151 tons in De-

cember, 1919. Total exports of steel plates in 1919 were 177,466 gross tons as against 163,420 in 1918.

Structural iron and steel exports dropped from 22,939 gross tons in November to 15,375 in December. In December, 1918, the total was 20,045. In 1919 the total was 360,787 gross tons as against 232,714 in 1918. France drew heavily upon the United States for structural steel for rebuilding her industries in 1919, the total tons exported to France being 79,665 as against 26,795 in 1918. There was exported to the United Kingdom in 1919 only 1399 gross tons as compared with 5038 in 1918.

Exports of machinery in December were valued at $27,252,866. In November the total was $34,103,136, in October it was $33,350,888, and in September $29,655,048. In December, 1918, the total was $25,562,429. Exports of machinery during 1919 were valued at $379,178,652, a considerable increase over the total of $282,974,797 in 1918.

Exports of Machinery

	December		Calendar Year	
	1918	1919	1918	1919
Adding machines	$136,425	$220,549	$1,974,250	$3,863,217
Air-compressing machinery	281,261	400,938	2,694,755	3,761,290
Brewers' machinery	2,045	57,368	130,357	213,590
Cash registers	89,920	302,046	763,317	4,080,588
Parts of	5,555	30,702	101,254	294,938
Concrete mixers	20,106	29,392	315,337	246,631
Cotton gins	12,640	3,632	113,317	295,746
Cream separators	129,768	40,191	841,171	1,093,821
Elevators and elevator machinery	214,642	125,898	2,215,537	2,601,543
Electric locomotives	42,310	7,986	183,200	835,978
Gas engines, stationary	38,956	65,702	478,871	692,584
Gasoline engines	1,355,338	2,128,358	24,402,896	32,801,867
Kerosene engines	993,842	249,602	8,536,113	7,824,599
Steam engines	3,166,703	3,177,912	27,064,042	32,227,070
All other engines	405,988	204,851	5,450,418	3,406,891
Boilers	333,862	400,422	4,415,467	6,361,229
Boiler tubes	660,416	281,416	6,405,728	7,916,665
All other parts of engines	3,124,480	1,106,915	24,420,286	29,319,190
Excavating machinery	96,772	138,103	1,274,926	1,165,763
Milling machinery, flour, grist	198,344	106,964	1,435,211	2,375,802
Laundry machinery, power	45,684	51,262	420,696	796,053
All other	39,511	47,720	269,136	399,736
Lawn mowers	30,355	23,287	239,836	478,583
Metal-working machinery (including metal-working tools)	.....	3,405,680	.....	58,507,942
Lathes	692,431	607,732	9,853,507	10,136,877
Other machine tools	796,534	837,217	11,626,360	12,490,600
Sharpening and grinding machines	381,697	244,863	6,161,876	5,494,060
All other metal-working machinery	1,526,405	1,715,868	23,978,554	30,386,405
Meters, gas and water	97 399	53,697	473,001	763,691
Mining machinery, oil well	237,288	349,180	2,759,286	3,613,972
All other	561,238	495,761	8,730,338	9 265,319
Paper-mill machinery	201,570	346,133	1,667,622	3,958,873
Printing presses	147,831	500,144	1,462,834	3,827,038
Pumps and pumping machinery	488,946	804 968	6,008,010	9,067,458
Refrigerating and ice-making machinery	79,214	119,045	1,436,110	2,141,110
Road-making machinery	122,242	65,097	697,522	987,912
Sewing machines	820 356	1,255,177	8,138,590	12,774,124
Shoe machinery	178,696	292,980	1,359,955	2,839,828
Sugar-mill machinery	1,322,039	1,326,912	9,468 511	13,805,940
Textile machinery	735,696	1,053,273	7,296,607	14,986,369
Typesetting machines	84,360	292,158	1,284,672	3,932 544
Typewriting machines	513,564	1,627,716	7,049,339	17,391 118
Windmills	52,919	113,966	772,003	1,091,543
Woodworking machinery, saw mill	139 823	56,149	1,154,789	1,141,248
All other	91,854	222,552	1,049,595	2,603,407
All other machinery	3,676,249	5,707,062	42,285,691	73,425,842
Total	$25,562,429	$27,252,866	$282,974,797	$379,178,652

Metal-working machinery exported in December was valued at $3,405,680 as against $4,546,045 in November. Steam engines valued at $3,177,912 were exported in December as against $1,466,198 in November. This item was one of the chief increases. Sugar mill machinery valued at $1,326,912 was exported in December as against $2,392,163 in November. Textile machinery valued at $1,053,273 was exported in December as against $1,342,595 in November. Typewriting machines valued at $1,258,395 were exported in November, the December total, $1,627,715, being an increase.

Imports of iron and steel in December amounted to 39,797 gross tons. The total in November was 43,828; in October it was 40,705 and in September, 43,892. In December, 1918, the total was 28,445 gross tons. The imports in 1919 amounted to 322,261 gross tons as against 179,702 in 1918.

Imports of pig iron of various kinds totaled 12,777 gross tons in December, while in November the total was 22,883 and in December, 1918, 1670. Imports of scrap totaled almost the same in December as in the same month of 1918, the total in December, 1919, being 20,218 and in December, 1918, 20,304.

Imports of manganese ore and oxide of manganese totaled 36.376 gross tons in December, 1919, as against 11,694 in November and 16.863 in October. O. F. S.

Publicity for Accident Statistics Made Blast Furnace Operation Safer

In his paper on "The Prevention of Accidents by the Statistical Method," appearing in the National Safety News, 168 North Michigan Avenue, Chicago, Royal Meeker, United States Commissioner of Labor Statistics, writes the following concerning blast furnace accidents:

"Blast furnaces formerly contributed very largely to the fatal accidents in the manufacture of iron and steel. The heavy toll of deaths due to blast furnace accidents led to improvements in construction by which 'blow-outs' with their accompanying fatalities have been almost entirely eliminated. The substitution of mechanical charging of blast furnaces for the old hand charging method has practically eliminated fatal 'gassing' among the men who were obliged to work on top of the old type of blast furnaces. These improvements in the construction of blast furnaces were brought about as the result of the analyses of accident statistics and the calling of the attention of those responsible for the direction of industry to the causes of the more severe accidents."

Acquires Canadian Interest

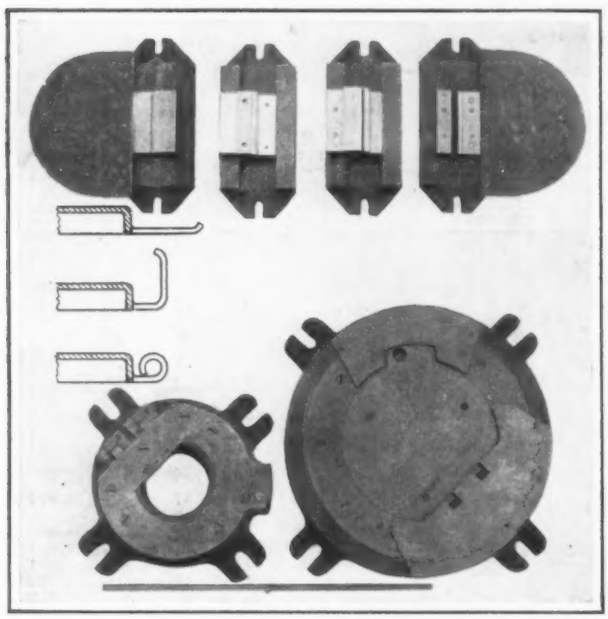
The American Car & Foundry Co. has purchased a substantial interest in the Canadian Car & Foundry Co., according to announcement of President W. E. Woodin, who has been elected chairman of the executive committee of the Canadian company. No change will be made in the management and practically no change in the present organization. In announcing the acquisition of stock, President Woodin said that there are many lines of co-operation between the two companies, particularly in the export field, for which the Montreal works of the company is advantageously situated.

The Canadian Car & Foundry Co. was incorporated in the year 1909 and acquired the properties and business of the Canada Car Co., Ltd., the Dominion Car & Foundry Co., Ltd., and Rhodes, Curry & Co., Ltd. It has since added to these properties and now has eight plants.

Dies for Forming Hinge Members

A new method of forming hinge members on sheet metal stamped parts, of particular interest to the automobile sheet metal shops, has been developed by the Service Machine Co., Elizabeth, N. J. In the second operation the number of hinge-forming dies has been reduced from three to two sets, and one operation in the handling and production of the product has been eliminated.

The construction of the blanking die for the first operation conforms to well-established practice. In designing the die for the second operation, however, the idea was conceived of combining with drawing the



Hinge Lugs Are Formed in Three Stages, as Shown in Section (center) By Forming Dies (bottom) Employing the Sets of Closing Dies (top) for the Two Stages Indicated By the Sectional Views of the Lugs

¼-in. flange around the contour of the blank the starting of the hinge formation. The ends of the hinge lugs were formed as shown above in section. It will be noticed that the material, cold-rolled steel, 0.05 in. thick, had to be rolled down to a very small radius and very close up to the flanged edge.

Earnings of Trumbull Steel Co.

Like the report of the Brier Hill Steel Co., the annual statement of the Trumbull Steel Co., Warren, Ohio, read Feb. 3 at the annual stockholders' meeting by President Jonathan Warner, indicates the irregular conditions which prevailed in the steel industry last year. Gross sales of $24,569,841 compared with $27,000,000 in 1918. Net earnings of $2,388,258 compare with $3,126,453 the year before. During 1919 the Trumbull company earned $192,392 from its Liberty plant near Leavittsburg, Trumbull county, which was acquired July 1 from the Liberty Steel Co. The statement of earnings is net after deducting taxes, dividends and other charges.

Substantial additions were made to surplus, for the surplus fund of $9,000,000 Dec. 31 last compares with a surplus of $6,532,924 at the close of 1918.

Plant valuation is fixed at $18,500,000.

The company now employs 6,000 men and its payroll in 1919 was $8,000,000, $1,000,000 higher than the year before.

Production in 1919 was 198,500 tons and about 200,000 tons were shipped, surplus stocks being drawn upon.

The Trumbull company now has under construction at its Trumbull plant in Warren 9-in. and 12-in. Morgan continuous hot-rolled strip steel mills and is doubling the capacity of its cold-rolled strip steel department. The mills are being furnished by the Morgan Construction Co., Wooster, Ohio. With the additions, the strip steel department will have an annual capacity of 150,000 tons.

During the year about three months operations were lost, one month through the strike of steel employees, another because of the coal strike, and another due to interrupted business early in 1919 and layoffs on account of excessive heat in midsummer.

The company's plants comprise seven 100-ton open-hearth furnaces, blooming mill, 18 and 21-in. Morgan continuous bar mills, 44 sheet, tin and jobbing mills, including 29 tin mills, 13 sheet mills and two jobbing mills, with complete galvanizing and tinning departments; a 16-in. continuous hot-rolled strip steel mill and a cold strip steel department. The Liberty plant, included in the above description, contains 10 tin mills.

Total yearly capacity of the plants is 300,000 tons of finished product.

Mr. Warner states output in January was encouraging and if production can be maintained 1920 should prove to be the best year in the company's history. Last month ingot production was broken, the seven furnaces producing 34,000 tons, or at the annual rate of 408,000 tons, double the 1919 output.

The company owns 700 acres of coal lands near Brownsville, Pa., where its gas coal is produced and its requirements fully met. It also owns a one-fourth interest in 17,000,000 tons of Lake Superior basic ore. Plans have not yet matured for blast furnace construction, the next step in the company's development.

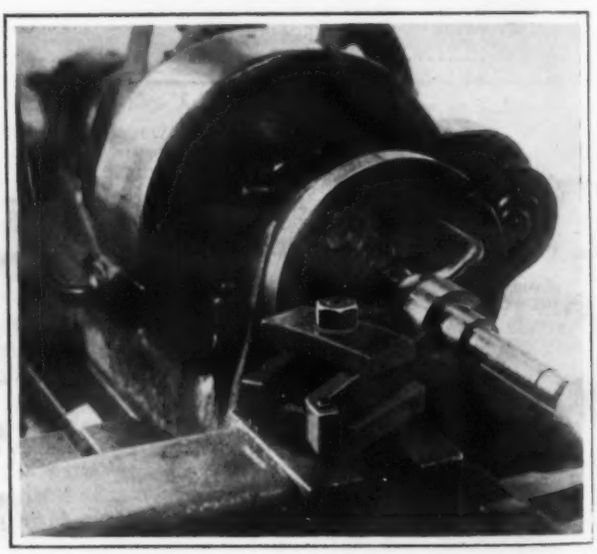
Trumbull Steel Co. is capitalized at $24,000,000, of which $14,000,000 is common and $10,000,000 preferred, $20,000,000 being issued in equal amounts of common and preferred. In 1919 the company paid 10 per cent on its common stock and 7 per cent on preferred.

Directors and officers were re-elected.

Broad Grip Double Tool Post

A new tool post is being placed on the market by the Connery Machine & Tool Co., 56 Harrison Avenue, Springfield, Mass. It is called the P. M. B. double tool post. It is built of heavy steel of simple substantially unbreakable parts. It has a broad solid jaw, which clamps two tools. An irregular hexagon-headed clamp bolt permits it to be used in the T-slot of the cross-slide of any lathe.

The broad flat grip on the tool post tends to eliminate vibration, which the inventor claims greatly pro-



A Broad Jaw Makes for Gripping Power in This New Type Tool Post

longs the life of the tools. A combination of a convex washer under the clamp nut and a strong but flexible spring allows the upper jaw to adjust itself to various heights of lathe tools. A curved plate under the lower jaw allows adjustment of the tools up or down to suit the conditions of the work. By the use of two tools two cuts may be taken simultaneously on a turning or facing operation, and by using two thread-cutting tools, one set ahead of the other, a roughing and finishing cut may be taken at the same time.

Industrial Relations

An Individual Problem

Short Talks on Vital Questions by One of Experience

This is the third of a series of articles on Industrial Relations by Thomas Stanion, director of safety, Aluminum Manufacturers, Inc., Cleveland, formerly the Aluminum Castings Co. Valuable suggestions on how to approach shop workers are made.

One of the cardinal principles of men to-day is interchange of ideas. Through it we avoid pioneering and grow the faster. In working out the details of our employees' problems which have come to be known as employees' industrial relations, we are helped indeed by the experience of others. From that we fortify ourselves on the fundamental principles. Yet even though we bring together all the experience in this problem, successes and failures alike, for there is much of both classes, we are unable to deduce a single standard formula which can be applied with even reasonable benefit to all industry. Employees' industrial relations have not been reduced to a science like that of electricity or hydraulics, nor does it seem from the present light that such can be done. Each company presents a problem in itself and must be handled as such. In the first place, no two business organizations are exactly alike. Obviously the founding, growth, development, spirit, environment, and ambitions are different and, all being vital factors, require careful consideration.

Even though there are these variables in the problem and though we have no set formula for its solution, yet one underlying principle applies in all cases and can be stated quite clearly. This is our good old Golden Rule—the Square Deal—often stated and applied, yet sometimes so distorted as to make its identification difficult. Remember—this whole question concerns itself with men. Let the manager put himself in the job of the humble laborer in the far corner of his plant alone with his work and his thoughts, and then in all sincerity ask himself these questions: "What ought I have from this company in return for what I put in? What should my pay envelope bring me? How should it be determined? What other relation than my job and my pay envelope should I have with my company? Should I have a voice in deciding hours, wages, working conditions, etc.? Should I have a share in profits as a whole?" I say, let the manager, transplánted, ask himself these questions and give himself honest answers. They will shed real light on the problem and point the way toward its solution.

The workers in our shops, taken as a whole, are sensible, reasonable business men with a keen understanding, relatively speaking, of the proposition in hand. Office employees would to-day offer just as acute problems as factory workers, were they not able to feel the pulse of the business and understand its conditions. The shop workers, when properly approached with language they can understand and shown that they are expected to enter into a plan on a definite business basis and that this is no new cloak to veil the real issue, accept in good faith and can be relied on to stand firmly for fair play to all concerned. The difficulty lies in the fact that often this plan means a radical move on the part of the management and when the test comes they have not faith sufficient to see it through. For misunderstandings are liable to arise at the outset and sometimes conditions entirely beyond the control of either party will have to be met and may result in apparent failure—yet if the management is thoroughly convinced, literally "sold" that the plan is right, sticking to it just as they back up a sales or manufacturing program and modifying details as changing conditions require, ultimate success is bound to come.

To work out the details of the right plan and follow its introduction properly in any of our modern industrial corporations is a job challenging the skilled efforts of the very best man obtainable, a man who can live and express the confident cooperative contact the management desires to establish with its workers. Such a man does not in any way relieve the management of its responsibility but rather enables it to take its place in the program more intelligently. To solve this individual problem involves many important factors, for any relation the worker has with his employer offers a chance to show him the real value placed on his efforts and that he is considered an essential component part of the organization worthy of and to receive treatment as such. Through such arrangements the reality of any plan can be emphasized and the more real it can be made to the workers the better the results to be accomplished. Lastly, such a man will insure that this problem is not to be slighted, thereby adding a much desired dignity.

Of peculiar significance are the results of recent efforts to bring about solutions for this problem through national, state, and community gatherings. Little progress has been made. Could other results be expected? The problems are individual with all the differences inherent and of their very nature cannot be grouped into a class and solved as such. The right conditions will not be obtained by group handling carried back to the component members but rather by the separate factors, each working out its own salvation, and thus add one more stone to the structure which will represent industrial harmony.

Iron ore exports from Norway in the first half of 1919 were only 10,097 tons as compared with 57,744 tons and 113,176 tons in the same period in 1918 and 1917 respectively. Pig-iron imports to July 1, 1919, were 7249 tons against 8277 tons and 13,027 tons to July 1, 1918 and 1917, respectively. Demand for foreign-made steel plates and sheets, as well as galvanized sheets, has been heavy. To July 1, 1919, imports of steel plates and sheets had been 19,623 tons as against 8423 tons to July 1, 1918. Of galvanized sheets 11,012 tons was imported to July 1 last year, which is twice the quantity brought in in the same period in 1917.

The new slag crusher for Anna furnace at Struthers, Mahoning county, Ohio, authorized by the Struthers Furnace Co., Cleveland, will crush slag in sizes from 2-in. to ½-in. and sand. The crusher will be electrically driven. After it has been fed into this crusher, the slag will be hoisted to the top of the storage building and discharged into a cylindrically-built screen, which revolves horizontally over a series of bins. Through meshes in the screen the slag drops into the bins below and is discharged through doors at the bottom into railroad cars or may be dumped through chutes into trucks or wagons which load at one side.

Developments in Some of the Rarer Ferroalloys

The following extracts regarding some of the recent developments in the more uncommon ferroalloys are taken from British sources:

Ferromolybdenum

During the last couple of years the Canadian Imperial Munitions Board have produced 100,000 lb. of 70 per cent ferromolybdenum by the direct smelting of molybdenite concentrate at the works of the Tivani Electric Steel Co. Belleville, Ont. Vertical cylindrical furnaces of the single phase type are employed, requiring 3000 to 4500 amp. at 50 volts per furnace. Each consists of an iron shell, lined with red brick, fire brick, silica brick, and carbon in succession, and resting on a concrete foundation. The lower electrode consists of a water-cooled bronze or copper block, from which iron rods project upwards into the furnace bottom, and the upper electrode of a graphite or carbon rod. For the production of 70 per cent. alloy from concentrate containing MoS_2 75 and Fe 9 per cent, the charge consists of concentrate 100, lime 120, coke 10, and scrap steel 5 lb. Each furnace is tapped every 4 hr., the output being 1050 lb. of alloy per 24 hr. During the two years in which the plant was operated for the production of ferromolybdenum containing Mo 70, S 0.4 and C 4 per cent, the average composition of the product was Mo 70.43, S 0.38 and C 3.56 per cent.

Ferrouranium

Up to the present time the use of uranium in steel manufacture is not very fully developed or understood. The abundance of sodium uranate ($Na_2U_2O_7$), a by-product from the extraction of radium and vanadium from carnotite, provides the material from which the oxides are produced. The alloy is made by reducing the oxides with carbon according to the equations, and then mixing with iron.

$$UO_2 + 2O = U + 2OO$$
$$U_3O_8 + 8C = 3U + 8OO$$
$$3UO_2 + 5C = U + U_2C_3 + 2CO$$
$$U_3O_8 + 11C = U + U_2C_3 + 8CO.$$

The alloy usually contains from 25 to 35 per cent of uranium and under the microscope the uranium seems to be present, as the double carbide of iron and uranium, Fe_3C. U_2C_3, as a eutectic mixture of iron and carbon. It has been claimed that 0.5 per cent. of uranium will replace several per cent of tungsten in tool steel, and the alloy is being used in making ternary uranium and quaternary uranium-tungsten steels.

Ferrozirconium and Boron

Ferrozirconium and boron is one of the latest of the ferroalloys to come into use. It is made by the reduction of zirconia, with aluminum, by the thermit process, to the element and then alloyed with iron. In Great Britain a 20 per cent ferrozirconium has been used to some extent in the place of ferrotitanium.

Ferroboron can be made by the reduction of a mixture of boron oxide and iron oxide with carbon in the electric furnace. Not much is known about this alloy, but experiments in France have shown that a very strong and tough steel can be made by using from 0.5 per cent to 2 per cent of boron.

Ferroaluminum

Ferroaluminum has been largely replaced in recent years by the metal aluminum, but it is suggested that a revival of its use would be desirable. It can be made by mixing scrap iron or iron ore with bauxite and reducing material. It formerly contained from 10 per cent to 20 per cent aluminum, but recent success in the production of ferroalloys indicates that a 50 per cent alloy could be produced. Aluminum is seven times as powerful as silicon and 28 times as strong as manganese in acting upon the oxygen dissolved in steel, so that from one ounce to one pound of aluminum is sufficient to deoxidize a ton of steel.

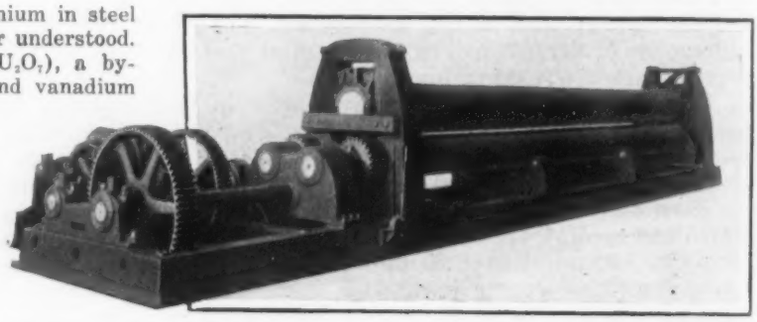
Qualities of American Engines

WASHINGTON, Feb. 10.—In a comparison of American and European internal combustion engines offered for sale in South America, Consul Wilbur L. Bonney, Rosario, Argentina, states that the American makers quoted lower prices, but that their products have not the reputation for durability and efficiency that the European makes have.

"European makers do not compete with American makers on the basis of price, but rely on the durability, efficiency and quality of their engines," says Mr. Bonney. "The notoriously cheaper first cost of American engines adapts them to temporary and experimental undertakings in agriculture and industry, and this kind of undertaking naturally abounds in a developing country where the tenant farmer plays an important role. This represents the reputation which the American engines have made, and it would seem wise to develop it further in the same direction, rather than to enter upon rivalry with European qualities not especially adapted to the stage of development of Argentina."

Large Plate Bending Rolls Installed

One of the largest plate-bending rolls built in the Central States has been installed by the General American Tank Car Corporation at East Chicago, Ind. The machine was sold by Joseph T. Ryerson & Son and built by Kling Brothers Engineering Works, Chicago. It is provided throughout with steel gears with cut teeth and all bearings are bronze bushed. The machine measures 34 ft. 2 in. between housings and has capacity for bending ¾-in. mild steel plates. The top roll is 29 in. in diameter and weighs about 40 tons. The bottom rolls are 21 in. in diameter and have two roller supports. The rolls are mounted on a rigid cast-iron sub-base and have independent motors for main drive and for power adjustment of the top roll.



The Plate Bending Rolls Installed at Plant of General American Tank Car Corporation Measures 34 ft. 2 in. Between Housings and Have a Capacity for Bending Mild Steel Plates Up to ¾ in. Thick

To Equip Sugar Houses

BIRMINGHAM, ALA., Feb. 10.—The Payne, Josselyn Co., the Ingalls Iron Works and the Birmingham Machine & Foundry Co. have closed a co-operative contract with Cuban cane growers for $3,000,000 per annum of complete sugar houses. The first-named is to furnish the vacuum pans and condensers, the second the structural steel and the third the crushing machinery.

The Alabama Power Co. is making surveys in Etowah and Cherokee counties, Alabama, with a view to extending its hydroelectric transmission lines to Rome, Ga., there to connect with those of the Georgia Power Co., which, in turn, connect with those of the Southern Power Co.

Charging $7 at Pittsburgh

PITTSBURGH, Feb. 10.—Coke companies in the Pittsburgh district are freely charging $7 for foundry coke shipped to blast furnaces, and believe they have a perfect right to do so.

Improved Labor Conditions Are Reported

Serious Problems Are, However, Being Considered at Washington—Director Hines Trying to Work Out a Compromise—End of Steel Strike Helps Stability

WASHINGTON, Feb. 10.—While improved labor conditions are reported throughout the country, problems affecting employment are receiving attention by several Governmental bodies.

Representatives of the railroad brotherhoods and other unions have been in conference with Walker D. Hines, Director General of Railroads, during the past week, and demands of the railroad employees for increased pay, which were made several months ago but withheld at the request of President Wilson, have been under consideration. Mr. Hines has endeavored to work out a compromise which will be satisfactory. The union men are anxious to reach an agreement and establish higher scales of wages, if possible, before the roads go back to private control March 1.

Another wage question has been under consideration by the President's coal commission. With the exception of the filing of briefs by both sides, the operators and miners of the central competitive field have completed the presentation of their case to the commission. Attention is being given by the commission to outlying fields. One of the documents used by the miners in their case is a letter written by Secretary of Labor Wilson to John L. Lewis, acting president of the United Mine Workers, in which he explains in detail the method by which he concluded last November that the bituminous coal miners were entitled to an increase of 31.61 per cent in their wages, in order that the wages might be brought up to the level of the increased cost of living. Secretary Wilson reiterates his belief that Dr. Harry A. Garfield, former Fuel Administrator, reached an erroneous conclusion that the miners were entitled to only 14 per cent. The miners claim that there has been a further increase of 7 per cent in the cost of living since June, which was the date on which the statistics were compiled which were used by Dr. Garfield and Secretary Wilson.

Wages of Farm Hands

A report of the Department of Agriculture on wages of farm labor in 1919 furnishes an interesting sidelight on the general industrial situation. This report states that at no time have wage rates for farm labor been as high in this country as in 1919. For labor hired by the month with board, the average rate has been $39.82, and among the geographic divisions the average went as high as $62.96 in the Western division, including the Mountain and Pacific States. The lowest average was $30.54, in the South Atlantic division without board. Harvest wages per day with board reached the top figure of $4.48 in the North Central States west of the Mississippi River and the lowest figure of $2.28 in the South Atlantic district. The United States average was $3.15 without board.

General Conditions Better

The Federal Reserve Board, in its monthly review of business conditions, reports an evident improvement in general labor conditions throughout the country.

"In the East and North employment is reported as being full and labor is said to be in a more contented mood than for some time past," says the report. "High wages and generally satisfactory conditions of employment are given as the reason for this condition. At some manufacturing centers efforts are being made to increase wages on the ground that higher living costs make them necessary, but this argument in behalf of higher wages is apparently losing its force, employers feeling that the strong demand for luxuries indicates that there is a large surplus of buying power in the hands of consumers.

"In the steel districts the termination of the strike has resulted in a more stable condition of the labor market and the Pittsburgh district is now free from strikes, excepting minor local disturbances. In all parts of the country a similar condition is reported except that poor transportation conditions seem at some points to make full operation difficult, hence subjecting labor to some little irregularity of employment.

"At some points in the South and Southwest there are still complaints that labor is not working full time, but is using its high income to purchase leisure at the expense of production. Nevertheless, the general labor situation even in these districts is reported as the best for months past. There is some prospect of agricultural labor shortage in connection with the crop season now pending, but the extent of this is still for the future to determine.

"There are some strikes of street railway workers in various cities, and more or less unrest exists here and there, but from various quarters it is stated that a much better understanding of the industrial situation exists among labor organizations and that adjustments of wages already made have tended to restore good feeling."

Midvale Steel Subscriptions

The preliminary report on the stock and subscriptions by officers and employees of the Midvale Steel & Ordnance Co. and its subsidiaries under the 1920 offer, shows that 2616 employees subscribed for 14,046 shares at $50 per share, or a total of $702,300. The company offered not more than 8000 shares and these were heavily oversubscribed.

Employees receiving in excess of $4,200 per annum were entitled to subscribe for 10 shares and one share for each $1,200 of excess of salaries above $4,200. In no case were more than 20 shares allotted to any subscriber.

Payment is to be made in monthly installments, to be deducted from salary or wages. No installment shall be less than $4 per share and shall not exceed one-quarter of any month's salary or wages. Payment must be completed within 1920. Interest at 5 per cent will be charged on deferred payments.

As an inducement to retain stock, the company will, for five years, commencing January, 1921, make a special payment of $2.50 a year on stock.

The Kansas Court Plan

WASHINGTON, Feb. 10.—Keen interest is being shown in Washington in the experiment undertaken in Kansas in the establishment of its new industrial court. If this court, which was set up last week, following the enactment of a law by a special session of the Kansas legislature, proves at all successful in conciliating capital and labor, the idea is bound to receive serious consideration elsewhere. Congress, so far, has failed to evolve a plan for the adjustment of industrial disputes which has not met with great opposition. Enactment of national legislation along the lines of the Kansas law is certain to be urged if the Kansas experiment meets with any degree of success.

Employees of the Mullins Body Corporation, Salem, Ohio, have been given the privilege of buying stock in the company and many are taking advantage of the offer. Stock is selling at $44 a share. Employees are permitted to invest up to 20 per cent of their gross earnings. Due to curtailment of its gas supply, the company has arranged to use oil as fuel.

The striking employees in the cylinder department, Lockwood Mfg. Co., South Norwalk, Conn., have returned to work, a compromise having been made.

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published Every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

W. H. Taylor, *President and Treasurer* Fritz J. Frank, *Vice-President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Chas. G. Phillips, *Vice-Pres.* W. H. Taylor, *Treas.* A. C. Pearson, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Tremont Building. Philadelphia: Real Estate Trust Building. Cleveland: Guardian Building. Cincinnati: Mercantile Library Building. Washington: 613 Fifteenth Street, N. W. San Francisco: 320 Market Street.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $5.00; Canada, $7.50; Foreign, $10.00 per year. Single copy, 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879

Exports and Home Demand

In view of the concern expressed in various quarters over the check which the exchange situation is likely to give exports, it may be worth while to ascertain what statistics show regarding home consumption. The importance of export trade has been exaggerated as a result of the attention paid to it in the public prints and in business conversations. It is natural that one should hear on all sides of our opportunities of the moment and of those of the future in world trading. The United States throughout the war period was such a storehouse, that world relations, continued with our old established and begun with our numerous new exporting institutions, were naturally expected to mean an outward movement in peace-time products commensurate with the war movement.

Mention has already been made in these columns of the permanence which exporting in iron and steel has secured through arrangements by which many of our largest producers have obligated to set aside a definite percentage of their output for the benefit of those preparing for world competition. When, however, buyers do not desire as much as 10 per cent, which roughly amounts to our exports of 1919, home demand may then get more than its quota if it desires. Yet the efforts of the exporters will not be handicapped as they were in former times when exporting was only an expediency at times of small domestic buying.

If the exchange situation should materially curtail overseas shipments, the additional amount available for domestic use might help in preventing a runaway market. It would probably be the psychological effect rather than the volume available which would allay the fears of buyers, and in this way would we have the salutary dampener of panicky feelings. As a matter of fact the available supply of material for export is booked for four months and much of it is for countries with which exchange relations are not much different from the normal, such as the Far East and various nations neutral in the war time.

An investigation of pig iron production in terms of the population shows that for a period of thirty or more years the per capita consumption of pig iron has been in a constant ratio from year to year. At about the beginning of the twentieth century, the United States was absorbing pig iron at the rate of 430 pounds per person. This has gradually risen at a rate of about 3.3 per cent per annum until today it appears that we are using about 825 pounds per year for every person in the United States. In the last nine years on the basis of this constant ratio increase and beginning with 615 pounds per capita in 1911 and ending at 800 pounds per capita in 1919, the amount of pig iron which theoretically would seemingly suffice for the needs of the present scale of civilization totals 284,000,000 tons. Actually in the nine years production has totaled 285,700,000 tons. A good part of this has meanwhile, of course, gone into shells, engines of destruction and to help replace the loss of submarined ships. Without making any estimate of what this amounts to, it is clear on the face of the theoretical returns and the actual production figures that the United States is in want.

If the same ratio increase is to be maintained—of course some correction will be needed when the actual census returns are available—the pig iron needs of 1920 total 40,000,000 tons, and likewise those of 1921 will be 41,800,000 tons. With any close maintenance of exporting, it seems clear that the ratio will prove still to hold, and we are thus concerned as to the capacity of the country to produce at a rate to meet these demands.

On the basis of the operation of the furnaces of the country in the best month of their history, September, 1918, when all energies were bent toward securing production, the annual rate was somewhat in excess of 41,500,000 tons. Our best single year of production was 1916, when 39,435,000 tons was produced. The theoretical totals of demand average the fluctuations from year to year, and for years of small actual production there must be years of large actual production. It is clear that more blast furnaces are needed, for the new furnaces of 1919 and 1920 will not add much over 1,000,000 tons or bring total output to more than 41,000,000 tons and then only under unusually good conditions.

It is proposed to make further study of the relation of capacity and consumption, but mean-

while it is sufficient to indicate that our home consuming needs are not unlikely to put to pretty full use the numerous manufacturing plants whose expansion was accelerated on account of war demands. A slowing up of exports is not at the moment vital.

Returning the Railroads

The action of officials representing the 300,000 members of the Brotherhood of Locomotive Engineers and Railway Shop Workers in announcing a strike for February 17 promises to bring to a stormy close the experience of the United States Government in administering the railroads of the country. Director General Hines may succeed in patching up a compromise so as to keep the wheels going and if he does he will merely repeat what has been done in a number of other cases of threatened strikes of railroad employees during the past year or two.

Long regarded as the most conservative of labor unions, the Brotherhood of Locomotive Engineers has become one of the most radical, and under its leadership the affiliated brotherhoods have made demands that, although not fully granted, have caused the piling up of an immense deficit in the operating costs of the railroads. The demands seem extreme in the present case as in others, but it must be said in all fairness that they are merely in harmony with the demands of many other labor organizations.

The terms under which, in all probability, the railroads will be returned to their owners represent, of course, a compromise, one of the most notable of which is in regard to the anti-strike clause, in the place of which has been substituted a very mild provision for the adjustment of industrial disputes. Owing to the extremely vigorous opposition of the labor unions to the anti-strike clause of the Cummins bill and to the fact that public sentiment outside of the labor unions was divided in regard to its expediency, it is not surprising that it was eliminated. As to other provisions, there were likewise compromises. The measure on the whole seems to be a very fair one and promises to give the railroads a chance for operation at a reasonable profit, although it is doubtful whether they will be able to buy equipment to the extent necessary to put them in first-class condition.

The experiment of the Government operating the railroads has been a costly one, but if it has shown the hopelessness of obtaining satisfactory results by anything except private ownership with Government supervision, it is worth all it has cost. There were many people in addition to labor union members who would have been glad to have the railroads remain under Government control two or three years longer in order finally and more thoroughly to test Government efficiency, but now that the railroads are about to go back to their owners, it would be surprising if there were any important agitation for many years in favor of the Government resuming control to the extent which has prevailed during the war period or of acquiring ownership. Government operation has not been wholly bad and some of the policies inaugurated will not be abandoned, but for the most part the superiority of private ownership under competitive conditions has been demonstrated.

Sulphur in Steel Castings

One of the most valuable contributions to the subject of sulphur in steel castings was presented by Prof. A. E. White of the University of Michigan at the American Foundrymen's annual convention in Philadelphia last October. An abstract appears elsewhere in this issue. The author speaks with considerable authority because of his intimate connection with the steel foundry industry during the war.

Much was said early in the war and before about the effect of an increase of 0.01 or 0.02 per cent in the sulphur content in castings. This subject has absorbed a great deal of the time of more than one technical society. The necessity of increasing the specification limits was only reluctantly met then because conditions were such that sorely needed Government castings could not be obtained under the specifications then prevailing. Colonel White goes to the root of the matter when he contends that undue emphasis is placed on the wrong factor in talking about the effect of such an increase when, by improper annealing, improper steel making and by improper foundry practice, properties many times worse than those produced by sulphur are acquired. There is no doubt that sulphur has been the cloak that has covered a multitude of sins. Its presence has been sufficient to explain defects due to other causes. Colonel White emphasizes the difference between sulphur in steel castings and sulphur in rolled or forged steel.

It is now nearly three years since Government and railroad specifications were changed to increase the permissible sulphur limits. The testimony of Professor White and others have not revealed that any harm from this supposedly radical change has resulted. One or two technical committees of prominent societies are now further investigating this subject. It is also to be taken up by a joint committee representing the American Society for Testing Materials, the Bureau of Standards and the Railroad Administration. The scope of the study has been amplified as a result of the war measures. It is probable that it will be demonstrated that an increase of 0.01 or 0.02 per cent or more of sulphur in steel castings is of relatively little consequence. Instead, there will come out wider realization that the matters of foundry practice already mentioned are the more vital factors making for an acceptable product. Among the chief factors, five in number, which the author cites as affecting the quality of steel castings, sulphur is not mentioned. The progress of the industry is persistently confirming the secondary position of the sulphur factor.

The structural steel export movement since the war is characterized by one or two significant features. The movement to France has increased decidedly as has also that to Japan and South America. Argentina and Chile were heavy buyers last year. Even China has been prominent. In the aggregate last year's export move-

ment of shapes was not far from that of 1913, the record year. They were 31,300 tons per month, against 33,600 tons monthly in 1913.

The Radicals and the Unions

A news item telegraphed from Pittsburgh a few days ago announced that William Z. Foster, secretary of the strikers' committee which conducted the recent steel strike, had retired from this position and that a farewell dinner was given to him at which he was presented a gold watch. It was also said that Mr. Foster expected to go to Chicago to write a book and would not take an active part in labor affairs in the near future.

Thus ends for the time at least the active career in labor circles of a syndicalist who a few years ago was an advocate of the most extreme methods of the radicals, including sabotage and the shedding of blood; a man who, coming into the steel industry without any real knowledge of it, endeavored to obtain recognition from the highest officials of the greatest steel companies, and, failing in this, was instrumental in bringing about a strike which caused heavy losses to both steel companies and their employees, especially the latter.

There is now a universal feeling that the complete failure of the strike was due very largely to the un-American teachings of Foster and his associates and it is indeed unfortunate for the cause of organized labor that any of its members should be found willing to sit at a dinner given in Foster's honor. The men who did so have not yet learned that the case of the unions is absolutely hopeless as long as such men as Foster are tolerated. President Gompers, right in the beginning of the strike, failed to take advantage of his opportunity to repudiate Foster and afterwards attempted to excuse him for some of his outrageous teachings. Gompers doubtless was afraid to antagonize this radical, but that was no excuse for his failure to do what was right. That failure simply allowed Foster and his ilk to plan to "bore from within," as they had threatened to do and doubtless are doing and will continue to do. Until the labor leaders take a definite stand on this important question they cannot command the respect of the American people.

In another way the labor unions must change their tactics, and that is in regard to organizations other than their own of working people. It was clearly shown in the evidence taken by the Senate committee at Washington and by the proceedings of the Atlantic City convention of the American Federation of Labor that the federation was absolutely opposed to any kind of collective bargaining except its own kind; that is, the bargaining which recognizes no organization of laboring people except the American Federation of Labor. In fact, one of the demands of the strikers was for the abolition of shop unions. Such intolerance is un-American and must be given up if the unions are to make real progress.

Dr. Royal Meeker, United States Commissioner of Labor Statistics, who cannot be accused of being unfriendly to labor unions, said in a recent address that it is often true that the workers' committees in the large plant are able to secure better conditions and more consideration for the workers than the workers are able to secure for themselves in the smaller plants, and yet the policy of the A. F. of L. would be to wipe out all such committees that have to do with policies which the union aims to control itself absolutely. Such a position is autocratic and unreasonable.

The labor unions have much to learn from the recent strike, but so far there is not much indication that they are willing to learn any of these lessons. They seem to be perfectly content to go ahead along the old lines, and if they do, new defeats will come to them.

The Anti-Metric Fight

A call to arms has been sounded by the American Institute of Weights and Measures. THE IRON AGE urges attention to the call. Readers of this item are accordingly asked to get into touch with the office of the Institute, 115 Broadway, New York, if they are not already identified with the Institute and have any concern over the legislation calculated to bring the metric system into compulsory use. The reader is also asked to send in the names of all manufacturers in his district, so that the Institute may reach them with the story of the active propaganda which is being maintained in the interest of the metric system.

There is no let-up in the volume of pro-metric literature which is coming from what is called the World Trade Club in San Francisco. Like all movements of the sort, numbers are led to espouse the cause who have nothing at stake and are not fully informed. It clearly looks that the anti-metric fight will have to be won with the use of money just as money seems to be freely available for the metric proponents.

Operating Under Difficulties in the Youngstown District

YOUNGSTOWN, OHIO, Feb. 9.—Indicative of operating conditions in the iron and steel industry in the Mahoning Valley is the statement of a leading producer that in all the years of his experience conditions were never so difficult. Epidemic of influenza has combined with fuel and transportation difficulties to further impede schedules. At one time, 20 puddling furnaces at the Girard, Ohio, plant of the A. M. Byers Co., Pittsburgh, were idle through illness of workmen. In the general offices of a district company 50 employees were absent one day because sickness prevented attendance upon their duties.

"Fuel is scarce but we are hanging on," is the way the management of the Brier Hill Steel Co., one of the leading sheet producers, characterized the situation.

Upper and Lower Union mills of the Carnegie Steel Co. resumed after a week's shutdown. The plate mill of the Sharon Steel Hoop Co. at the Haselton works, was compelled to suspend Feb. 5 because of coal shortage.

The 12-in. and 20-in. bar mills at the Brown-Bonnell works of the Republic Iron & Steel Co. are idle.

Sheet makers are adhering to their policy of accepting no new business though tempting premiums continued to be offered by prospective purchasers. No improvement in the general situation with respect to deliveries is looked for until well toward the middle of the year. Aggregate of the business offered is sufficient to occupy the sheet capacity of the district until the end of the year, even with normal output.

Only regular buyers of semi-finished material are able to get output, because of restricted production and heavy demand.

MANY EMBARGOES

Statement of Steel Company Shows How Movement of Freight is Blocked

PITTSBURGH, Feb. 10.—The traffic department of one of the leading steel companies at Pittsburgh prepared, under date of Feb. 9, a complete statement, showing traffic conditions on some of the leading railroads and at principal points of distribution. It proves clearly that the car situation and the movement of freight at this time are in much worse shape than two years ago, during the severe winter weather. The statement issued follows:

P. C. C. & St. L.: Embargoes on P. C. C. & St. L., eastbound through Columbus, Ohio; westbound to points beyond the Chicago switching district.

Fort Wayne Route: Pennsylvania Co. is embargoed both east and westbound through Mansfield, Ohio, and westbound to points beyond Chicago switching district.

Toledo Gateway: Embargo all carload freight from all points routing northbound, through Toledo or via Michigan Central, D. & T., S. L. D. T. & I.—Ann Arbor, Detroit branch of N. Y. Central-Jackson branch of N. Y. Central for destinations beyond Jackson, Mich. Permits will be issued as conditions warrant.

Buffalo Gateway: Embargoed on carload freight to all points east of Buffalo and Clearfield on New York Central. All points east of Buffalo on or via D. L. & W. and Lehigh Valley, and all points east of Hornell, on or via Erie Railway. Does not affect outstanding G. O. C. or F. T. C. permits.

Delaware & Hudson R. R., effective Feb. 5: All carload freight from connecting lines at Wilkes-Barre and Hudson, Pa., and Binghamton, N. Y., for all points on or via D. & H. Railway.

Harlem River-Maybrook: Regional directors embargo all carload shipments via Harlem River gateway, also via the Maybrook route destined New England points.

Pennsylvania Railroad: Pennsylvania Railroad embargo all shipments carload and less, destined points and connections east of Trenton, N. J.

Central Railroad of New Jersey: Embargo all carloads and less carloads for delivery east of Boundbrook, N. J.

B. & O.: Embargo all carloads and less carloads for all stations in New York, Brooklyn and points on Staten Island Rapid Transit Co.

Cleveland: All lines embargo carload shipments for delivery within Cleveland switching limits, except that lines handling shipments into Cleveland will make deliveries to consignees having private sidings from their line.

Akron, Ohio: All lines embargo, all carload freight destined to Akron, East Akron or South Akron, Ohio, for either B. & O., Erie, L. E. & W., or Pennsylvania Co. delivery.

St. Louis Gateway: Missouri Pacific and S. L. & S. F. embargo all carload freight from connections to all points on or via these lines.

Texas Oil Territory: Practically all points in this district embargoes. Permits are issued when conditions warrant only upon application by consignee.

Illinois Manufacturers Protest

The Illinois Manufacturers' Association, Chicago, has sent a telegram to Walter D. Hines, Director-General of Railroads at Washington, protesting against a recent ruling prohibiting box cars from being loaded with any other commodity except print paper, sugar and one or two other products. The telegram follows:

"After thorough consideration of your recent order effective Feb. 8, prohibiting box cars from being loaded with any commodity other than print paper, pulpwood, sugar, less carload merchandise and grain, which leaves to the discretion of carriers' inspectors the question of the fitness of cars for such loading, thereby offering opportunities for serious discrimination, the Illinois Manufacturers' Association believes, now that former war conditions no longer prevail, normal railroad methods should obtain, and business which suffered tremendous losses and discriminations which could only be justified by war emergencies should be given each its proportionate share of railroad cars and transportation.

"The railroads have fallen far behind the business needs of the country, and under the best operating methods cannot possibly care adequately for the country's needs. Therefore, we believe no cars should be moved empty where there are loads to move in the direction the empties are needed.

"The Illinois Manufacturers' Association therefore strongly protests this order and urges you to withdraw same and to at once resume normal and non-discriminatory methods of car distribution, thus giving equal justice to all as contemplated by law and American standards."

CONTENTS

To Market Brazilian Iron Ores

The Itabira Syndicate is going forward with its investigation looking to the extension of the railroad which has its terminus at Victoria, north of Rio de Janeiro, Brazil, to Itabira de Matto Dentro, in the province of Minas Geraes. C. M. Weld is carrying on the investigation of the iron ore and the steel works site for Perin & Marshall, 2 Rector Street, New York, who are the consulting engineers for the company.

This is a large project which contemplates the building in England of twenty 15,000-ton ore ships for the shipment of some 5,000,000 tons of ore annually from Victoria to European markets besides manufacturing in Brazil such steel as that country now requires.

It is expected that America will absorb 1,000,000 tons of ore of this character. The shipment of this ore to the United States is going to be an important thing for the furnaces along the Atlantic coast.

The ore contains 68.95, 69.26 and 70.30 per cent metallic iron. The phosphorus varies from 0.022 to 0.4; in some cases phosphorus is found to be only 0.0024. This ore can be used in the open-hearth furnace and for the manufacture of special Bessemer steel, and it is anticipated that the enterprise will finally succeed in bringing to market these deposits of iron ore widely regarded as the most wonderful in the world, wonderful in their purity and also in the magnitude of their occurrence.

United States Will Not Bolster Exchange

Industries Looking to This Government Helping the Foreign Financial Situation Will Be Disappointed—Secretary Houston States His Position

WASHINGTON, Feb. 10.—Industries that are looking to the United States to step into the breach to bolster up collapsing European exchange rates are doomed to disappointment. There will be no aid from the American Government to save British sterling or the French franc or any other foreign money from sinking even farther, no matter what adverse effect their continued drop will have on American exports or American industries generally.

The wiser heads of our factories have discounted this situation for some time. As a whole, the iron and steel industry has based its foreign trade on straight business prospects and relied less than the food and textile lines on Government support to make good the bills of their foreign clients. Secretary Glass has left no doubt as to his opposition to Government aid and Congress has repeatedly demonstrated that there will be no help there. The Glass policy was framed largely by Assistant Secretary Leffingwell, who for a long time was looked upon as Secretary Glass' successor. When the White House favor shifted to Secretary Houston, who has been looked upon as one of the cabinet members most friendly to England, there seemed a possibility that we might yet be led to respond to Sir George Paish's appeals for help. But as soon as Secretary Houston had taken over the Treasury post, he made it plain that there would be no change in the Glass policy. He told the newspapermen that he believed it would take Europe a generation to get on its feet again. But he insisted that it must give up the idea that some magic formula of finance would do the work. He declares that only work done by the peoples of Europe could accomplish the task. Further loans by this Government to Europe, he said, were not to be considered at this time. Whatever private initiative could do to alleviate the hardships of Europe and to help rehabilitate industries should be done, he said, especially in the matter of getting raw materials into European countries. He intimated, however, that the people of Europe must recognize that their salvation is in their own hands, that they must set to work at whatever they can find to do and must go in for a long period of rigid economy.

Senator Smoot's Views

The views of Congress are best presented by Senator Smoot of Utah who is probably the best posted member of either house on questions of Government finance.

"The international exchange and trade situation," said the Utah senator, "simply shows once more that the currents can't forever all flow in one direction. The gold has flowed to us and we are inflated with both gold and paper. Europe is inflated with paper. The world had $250,000,000,000 of paper money out. France has $7,360,000,000 of uncovered paper. Is it hard to explain why the franc is cheap?

"Some time ago, I made a speech pointing out the dangers of this situation. I made it because I had received information from New York that almost unbelievable sums were being invested in this country in the purchase of German marks at the low prices prevailing, and had been urged that something must be done to stop it. The sudden widespread agitation about the suspension of foreign trade owing to the depression of European exchange is merely the realization of what some people must have known would happen. The inevitable is upon us, that is all.

"Salvation is work. It is trite and anything but sensational, but it is everlastingly true that the only thing to save the world is for people to quit spending and go to work, producing and saving. Nothing else will correct the exchange situation. If Europe doesn't produce what it uses and something to exchange for what it must buy outside Europe, it must pay in gold. It must go to working and saving and it shows no disposition to do so. Neither does this country, for that matter.

"The people in Europe got, during the war, into the mental attitude of relying on their governments to take care of them. If there wasn't food enough, the governments would bring it from abroad. That cannot go on longer, but the people are still relying on it to continue. There is a perfect orgy of speculation, spending, get-rich-quick enterprise.

Have Come to the End

"We have come to the end of efforts to correct the inequalities in exchange through international financial arrangements. For a European government to maintain its exchange at a figure above that dictated by the free operations of commerce means that in one form or another we must lend it the money with which to pay its balances due on this side. That cannot go on any longer.

"Some of the European countries are rehabilitating themselves in a most encouraging fashion. Belgium is nearer back to normal than any other. Great Britain is doing splendidly, and Germany shows the right spirit. But France, Italy, Russia, Austria—they are not coming back yet."

It is difficult to estimate how the continued break in foreign exchange will lower domestic market prices. The export demand has been a large factor in increasing prices over here, and the cessation of that demand may result in lower home prices. Particularly is that likely in such lines as cotton, where the foreign buying has not only ceased but has turned into a cancellation of orders.

In most lines, however, the domestic demand has been greater than the supply and the volume of domestic business has been so great that Washington observers are still optimistic about the whole situation, and look for no widespread demoralization of prices or industrial activity. This should be especially true of the iron and steel industry.

The Chamber of Commerce of the United States has announced its willingness to participate in the proposed international financial conference as suggested in memorials circulated in several countries, provided the limitations of the United States as prescribed by former Secretary of the Treasury Glass are clearly understood and recognized by the other nations. It is a question whether the business men of foreign nations, who are pushing the matter, will believe it worth while to proceed with plans for the conference under the circumstances.

Internationalizing Debt

In the memorial circulated in some of the foreign countries was a hint that the purpose of the conference might be to start a movement for the internationalization of the war debt. This suggestion, meaning an invitation to the United States to cancel some of the allied debts, aroused severe criticism from former Secretary Glass, who made it clear in his recent letter to the Chamber of Commerce that under such circumstances the United States could not have anything to do with the conference.

In its announcement the Chamber of Commerce says:

"The European memorial apparently contemplates possible action by the United States Government of a

character that the Secretary of the Treasury distinctly declares to be disadvantageous to the interests of the United States as well as of foreign countries. The committee of the Chamber of Commerce of the United States agrees with this view as expressed by the Secretary of the Treasury. Unless, therefore, such divergence of view (between the European and the American memorials) be made perfectly clear, any conference such as that proposd might lead to misunderstandings resulting ultimately in disappointments and recriminations. This, in the opinion of your committee, it is important to avoid." O. F. S.

Sixty-Sixth Report of Thomas Iron Co.

According to the sixty-sixth annual report of the Thomas Iron Co., Hokendauqua, Pa., 169,409 tons of pig iron were produced in 1919. To secure proper costs, a sufficient labor supply and a desire to concentrate operations at Hokendauqua, No. 3 furnace will be dismantled and a larger furnace of modern design will be erected on its site. To serve both Hokendauqua furnaces a pig iron casting machine, complete, has been purchased and changes in yards and tracks necessary for its use are now being made. A new power plant is being installed consisting of water tube boilers, 3500 h.p. capacity, water treatment plant for boiler feed water and a complete new steam line. Says the report:

"The board has for some time viewed with much concern the modernization of competing plants in our territory, and felt that if your company was to survive, like changes must be made at Hokendauqua. Since your company has prospered moderately during the past three years, the present seems opportune to make these changes. Construction costs are indeed high, but the compensation in increased plant efficiency should more than counterbalance the extra expenditure necessary. We hope by these changes to maintain our position in the trade."

The company has sold for delivery over the next eight months about the capacity of the furnaces in blast and is covered for the quantity of materials to produce this tonnage at prices that indicate moderate profit. Operations at Richard mine have not been successful so far due to the high cost of labor. Exploration of local hematite ore properties the past year proved disappointing as to tonnage and cost of mining.

The board declared a dividend of 3 per cent out of the earnings of the six months ended Dec. 31. The net income for the year, after setting aside proper reserves for depreciation, extraordinary repairs and renewals, development, retirements,, compensation, uncollectable accounts and income taxes, was $249,080. Net income to surplus amounted to $99,080.

Becomes an Open Corporation

Fairbanks, Morse & Co., Chicago, manufacturers of engines, pumps, motors, hoists, etc., have decided to change from a close to an open corporation. For the first time since the organization of the company in 1858, outside capital has been taken into the business and employees have been given, and have exercised, the opportunity to purchase stock of the corporation. The company has changed its capitalization from 25,000 shares of common stock of $100 par value, representing assets of $20,000,000 to 325,000 shares of no par value. The present stockholders will receive 10 shares of new stock for each old share held. Of the remaining 75,000 shares of common stock, 50,000 will be issued at once, an initial offering of 12,500 shares to employees having been oversubscribed and 37,500 shares having been purchased by Lee, Higginson & Co., Chicago, to be offered to the public. The remaining 25,000 shares will be reserved for subscription by employees and future financing.

Structural Mill for the Algoma Corporation

The announcement has been made that arrangements have now been completed for the immediate commencement of construction of a new structural steel mill by the Algoma Steel Corporation at Sault Ste. Marie, Ont., to cost between $6,000,000 and $7,000,000. The product of this mill is expected to replace the greater part of the imports of this material. About 90 per cent of the structural steel consumed in Canada is now imported, and it is the hope of the Algoma Steel Corporation to supply that, or the greater part of it, from the new mills. Work will begin at once and the construction is expected to take from 12 to 15 months. The company has already four blast furnaces which will furnish much of the steel necessary for the new plant. About 500 men will be employed on construction work this winter and this number will be increased to 1000 in the summer. When the mill is completed, 600 will be employed.

The immediate financing of the venture is made easy by the possession of ready cash and other liquid funds of the corporation. The last annual report shows current assets of $13,834,842, while the current liabilities were only $2,449,790. The corporation's plans for this mill have been under consideration for some time, but it was doubtless felt that the enormous demand for steel, together with other favorable conditions, made immediate operations desirable.

Meeting of Detroit Steel Products Co.

Reports presented at the annual meeting of the Detroit Steel Products Co. this week indicate the company's output sold well into 1920, and that prospects are favorable for handling the largest volume of business in the company's history. Completion of the addition to the spring shop, now under construction, will make the company by far the largest producer of automobile springs in the country, as well as the largest steel window sash manufacturing concern in the world.

Directors were elected as follows: John G. Rumney, Victor F. Dewey, Leo M. Butzel, Henry Russel, Mason P. Rumney, R. S. Drummond, H. F. Wardwell, A. L. Baldwin and Edgar R. Ailes.

The following officers were re-elected: President, John G. Rumney; vice-president and general manager, Victor F. Dewey; assistant general manager, Mason P. Rumney; secretary, H. F. Wardwell; treasurer, Edgar R. Ailes; production manager, A. L. Baldwin.

New Installation of Greene Electric Furnace

The Standard Brake Shoe & Foundry Co., Pine Bluff, Ark., has purchased from the Greene Electric Furnace Co., Seattle, Wash., a 1½-ton Greene electric furnace. All other necessary equipment has been purchased and the building, which is to be of steel, concrete and glass, 110 x 120 ft., is in course of construction. The furnace is being installed primarily to manufacture the new cast steel plate backs for the locomotive driver brake shoes made by the company, but castings will be made for the trade also. Operations will begin about May 1.

Judson Mfg. Co. Adds Open-Hearth Furnace

The Judson Mfg. Co., San Francisco, Cal., has recently completed a new 30-ton open-hearth furnace, bringing the total to three. The plant has also been extensively reconstructed, making it one of continuous operation, thus greatly increasing the capacity of the rolling mill. The Judson company states that it is the only one on the Pacific Coast making sand cast forging ingots. The open-hearth steel capacity is estimated at approximately 6000 tons per month.

William M. White, chief engineer and general manager hydraulic department Allis-Chalmers Mfg. Co., Milwaukee, spoke before the monthly meeting of the Milwaukee Engineers' Society on Feb. 3. Mr. White gave an illustrated talk on the installation recently completed by the Allis-Chalmers company at Niagara Falls for the Niagara Falls Power Co. It was planned to develop 37,500 hp., and in tests it actually produced 41,000 hp. under a 212 ft. head and at 1500 r.p.m. The pictures also showed the production of the huge steel castings for the unit at the Falk Co., Milwaukee.

An Electrolytic Method for Determining Carbon in Steel

A method, new in principle and extremely simple, has been recently brought out by J. R. Cain and J. C. Maxwell for determining the amount of carbon in steel. It is claimed to be accurate within 0.01 per cent. The details were published by the authors in the September, 1919, issue of the *Journal of Industrial and Engineering Chemistry*.

The fundamental principle of the method which, it is believed, is of wide application, is the change of electrical resistance brought about in a standard solution by the precipitation into it of another substance. This substance is in this case carbon dioxide, obtained by direct combustion of the metal. The standard solution is barium hydroxide, of known electrical resistance. Hence the underlying chemical equation is: $Ba(OH)_2 + CO_2 = Ba\,CO_3 + H_2O$. The increase in the resistance is due to precipitation of barium ions. Not only is the principle new but the assembly of apparatus is also new, and offers many advantages for technical work over the methods hitherto in use for the measurement of electrolytic resistance. These require a complicated and expensive set of apparatus. Other new features are: The application of the "nomograph" for the graphical representation of resistance data, and the use of special conductivity cells with adjustable electrodes to facilitate the manufacture of any number of such cells without the same cell constant.

The purpose of the authors' study was to investigate the accuracy, speed and practicability of the method. A suitable absorption vessel, with electrolytic resistance cell incorporated, is described and illustrated, as well as the method of combustion adopted. Included in the descriptive portion are specially designed resistance-measuring apparatus and a convenient nomographic method of applying necessary temperature corrections.

Iron and Steel Direct from the Ore in Electric Furnaces

The manufacture of pig iron and steel direct from the ore in the electric furnace was discussed by Jean Escard, in *Revue generale de l'Electricité* for Nov. 15, 1919. The author takes up the various processes and the results in the production of malleable iron and ordinary and special steels. The *Technical Review*, London, gives the following abstract:

Malleable Iron—The first experiments were made by Stassano with a 200 hp. furnace. The composition of the ore and of the chemical ingredients is given, also of the resultant iron. The costs are detailed, the net total per ton being 94 frs.

The important Chaplet-Arnou trials are dealt with. Fifteen tons of metal were produced in the Chaplet furnace and the method of operation is described. In this furnace there are two distinct zones, one of reduction and one of fusion, the latter at a very high temperature. Very complete experiments with various ores and ingredients were made, which are clearly summarized. The hourly output and coal consumption per ton of iron are tabulated for agglomerate, briquette and powder charges, and another table gives the analyses of seven consecutive pourings. The metal produced resembled good Swedish iron. The efficiency of the processes was found to be surprisingly high. Estimated costs are given, and with current at 0.006 frs. per kw.-hr., wood charcoal at 60 frs. per ton and 66-68 per cent magnetite ore, the cost per ton comes out at about 92 frs. A second instance, with anthracite at 25 frs. per ton and rich hematite ore at 25 frs. per ton, gives 92.7 frs. as the cost, and this figure is corrected in the table for higher current costs.

The industrial utilization of the process is discussed, with particular reference to the encouragement of small foundries in scattered localities, which would be of great service to local engineering works. It is equally applicable to the production of cast iron.

Ordinary Steels—The experiments of Humbert and Heshey in 1914 with a 6-ton Héroult furnace are detailed, a time-table being given for the operation described. The principal economic and practical results of these tests are steel of great toughness and tensile strength, and simplicity of operation—a single operation in a single furnace. Rich and refractory ores, such as magnetic titaniferous ores, are specially adapted for direct production of steel. Other advantages are reduced labor charges, rapidity of manufacture and effective control of grading.

Less ambitious but equally successful experiments by Evans, in America, on tool steels, are referred to, also Stassano's experiments on high carbon steels.

Special Steels.—In the direct production of alloy steels, the difficulty is to get rid of impurities, such as sulphur, and it is necessary to introduce a special reagent, such as manganese or silicium, havnig more affinity for sulphur than for the iron or the alloy. The arc and resistance type of furnace appears from experiments made to be better suited to this work than the arc furnace properly so-called. The tilting type of furnace is preferable.

Effect of Hydrogen on Iron and Steel

German technologists have continued their researches since the armistice, one of these being the effect of various gases on iron and steel. The results suggest, says its London *Ironmonger*, that if the gases could be conveniently and safely applied, some of them and particularly hydrogen might be employed with advantage in certain metallurgical operations, as in the cementation process of making steel and in refining and hardening. The use of hydrogen with iron at high temperatures, however, unfortunately is difficult and dangerous, apart altogether from its high cost, and it is not likely therefore that it will be used for any of these purposes on any commercial scale, though it may continue to be used for research. When that gas is forced through molten iron it is found that any non-metals present such as arsenic, carbon, phosphorus, silicon, sulphur or oxygen are converted into gaseous hydrides while the hydride itself in any particular case may be split up again and the nascent hydrogen set free, under which conditions it will reduce any silica present in the metal, even at so low a temperature as 1292 deg. Fahr., the gaseous silicon hydride resulting.

From the practical point of view the most interesting of the results of this particular research lies in the revelation that a malleable iron may be made directly, by means of oxygen and hydrogen not only from molten iron but from solid pig. The inert character of nitrogen is confirmed by this research, that gas having no effect on the non-metals in iron, either in the solid or liquid state, notwithstanding the view very generally held that the carbon in iron will diminish if the metal be heated in an atmosphere of nitrogen, the real explanation of this diminution being the action of small portions of oxygen retained in the vessel with the nitrogen.

Two New Methods for Making Blast Furnace Ferrosilicon

Two methods of making ferrosilicon are covered by patents (U. S. 1,318,763 and 1,318,764) granted to the estate of J. E. Johnson, Jr., last October. In the first it is proposed to charge a high-temperature furnace with the usual ingredients for making ferrosilicon, with the exception that a feldspathic mineral is used as the source of silicon. At the high temperature needed to reduce the silica, the feldspar is decomposed and volatile alkaline metals driven off as oxides or carbonates, practically free from mineral acids and easily purified into salts of much value chemically. The fuel on heat consumption of the furnace is not materially greater than when using quartzite in the mix. In the second patent it is claimed that low-carbon alloys can be made in ordinary furnaces, preferably a small blast furnace with enriched oxygen blast, if sufficient temperature is produced to reduce a considerable quantity of silicon from the charge. It appears that silicon has the important quality of excluding carbon from the alloys to a progressive extent as its quantity is increased. This undesirable silicon is then removed on tapping the alloy from the furnace by mixing with a molten reagent made of iron oxide, lime and a little fluorspar. Silicon then replaces the iron in the reagent, and is fluxed as a lime silicate.

INSPECTION TOOLS EXHIBITED

Measuring by Light Wave Interference is Demonstrated at Hotel Astor

The exhibition of inspection equipment by the American Society of Mechanical Inspectors on the roof of the Hotel Astor, New York, Feb. 2 to 6, included the exhibits of 20 manufacturers of inspection tools. Jones & Lamson, Springfield, Vt., demonstrated the projectograph for measuring by projection of an object on a screen. Exhibits that attracted attention throughout the five days were those of the United States Bureau of Standards, the Wilton Mfg. Co., Boston, and Pratt & Whitney. All three demonstrated measuring by light wave interference, Pratt & Whitney using their Hoke blocks. Three of these with the same measurements were laid edge to edge in a box containing a strong light. Over the three blocks a glass flat, ground to within a hundred thousandth of an inch was placed, in which could be seen bands of light extending across two of the blocks in a straight line, but as the third block was slightly higher than the other two, a wave was produced in the lines where they crossed the blocks. Measuring by this means is based on the principle of light interference. When a beam of light is reflected back on itself by a plane surface, there is interference of light waves and at some points the crests of oncoming waves coincide with the troughs of reflected waves, neutralizing each other, while at other points they augment each other by coinciding.

The dinner of the society, on the opening night of the exhibition, was attended by about 70 members and guests. Addresses were made by C. E. Johansson, C. E. Johansson, Inc.; George R. Ross, Holt Mfg. Co., Stockton, Cal.; Arthur Knapp, Arthur Knapp Engineering Corporation; Alfred E. Hansen, United States Bureau of Standards; and Erik Oberg, *Machinery*.

The following officers were elected for the year: Paul E. Theis, president; Ernst Mentor, Benjamin Gilpin, vice-presidents; Herbert Bailey, treasurer; H. F. Winter, secretary.

Surplus Steel for Sale

WASHINGTON, Feb. 10.—Surplus steel totaling 25,000 tons has been offered for sale by the Navy Department. This tonnage consists of almost every variety of steel used in manufacturing, building, bridges, automobiles and shipbuilding, including sheets, black and galvanized, light and heavy gages; plates, black and high tensile, from ¼ in. thick and heavier; structural shapes, including angles, channels, I-beams, Z-bars and H-bars, black, galvanized and high-tensile forging billets, carbon steel and 3 per cent nickel steel; forging bars, carbon steel and 3 per cent nickel steel; bars, cold-rolled and medium steel, in rounds, squares, hexagons and flats.

The major portion of the material is located at East Coast navy yards and at Naval Station, New Orleans, and Naval Training Station, Great Lakes, Ill. All of the material has been bought and accepted under Navy specifications and inspection. It is said to be desirable stock, which it is believed the trade, inasmuch as it is offered for immediate shipment, will absorb in very quick time.

Catalogs of sale have been prepared, copies of which can be obtained at the Bureau of Supplies and Accounts, Navy Department, Washington, or at the office of the Salvage Appraisal and Sales Board at Navy Yards, Boston, New York, Philadelphia, Norfolk, Charleston, S. C., or Great Lakes, Ill. This catalog describes in detail the material and its location. A minimum acceptable price is stated in the catalog for each class of material, which prices are based on the present market prices.

The sale will be held on Feb. 26, at the Navy Department, Washington, Salvage and Sales Section of the Bureau of Supplies and Accounts.

The Navy Department will offer for sale, Feb. 17, a total of 800,000 lb. of steel sculls, pit scrap and 100,000 lb. broken crucibles which are at the Navy Yard at Washington.

Heavy Increase in Steel Corporation Orders

Unfilled orders on the books of the United States Steel Corporation, Jan. 31, were 9,285,441 tons, compared with 8,265,366 tons on Dec. 31. This is an increase of 1,020,075 tons, against an increase for December of 1,137,036 tons. The unfilled orders a year ago were 6,684,268 tons, or 2,601,173 tons less. The table below gives the unfilled tonnage for the Steel Corporation at the close of each month beginning with January, 1917:

	1920	1919	1918	1917
January	9,285,441	6,684,268	9,477,853	11,474,054
February	.....	6,010,787	9,288,453	11,576,697
March	.....	5,430,572	9,056,404	11,711,644
April	.....	4,800,685	8,741,882	12,183,083
May	.....	4,282,310	8,337,623	11,886,591
June	.....	4,892,855	8,918,866	11,383,287
July	.....	5,578,661	8,883,801	10,844,164
August	.....	6,109,103	8,759,042	10,407,049
September	.....	6,284,638	8,297,905	9,833,477
October	.....	6,472,668	8,353,293	9,009,675
November	.....	7,128,330	8,124,663	8,897,106
December	.....	8,265,366	7,379,152	9,381,718

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons; the lowest was on Dec. 31, 1910, when the total was 2,605,747 tons.

Vickers Contemplates Large Works in India

It is known in London that Vickers Ltd., Sheffield, England, has been in treaty with the Tata Iron & Steel Co., Ltd., Jamshedpur, India, with a view of establishing a large plant there for shipbuilding and the making of railroad cars and locomotives, and later on, of automobiles.

The plan discussed was that the Tata people should furnish plates and sections for shipbuilding, billets and ingots for large forgings and to put in such additional mills as the Vickers company might require to carry on their highly developed process both for war purposes and for commerce.

Ferromanganese and Manganese Ore Imports for December

Ferromanganese imports in December, last year, were 3427 gross tons as against only 177 tons in December, 1918. The total for 1919 was 33,022 tons as compared with 27,168 tons for 1918. The 1919 exports of ferromanganese were 2999 tons comparing with 3577 tons in 1918.

Manganese ore imports last December were considerably heavier than in November or 36,376 tons against 11,694 tons. The total for 1919 was 333,344 tons which compares with 491,308 tons in 1918.

A Chinese company is discussing with Perin & Marshall, consulting engineers, New York, the possible construction of a second blast furnace to be built near the one now in process of construction; also a steel works and necessary mills for rolling rails, bars, sheets and tin plate. This plant is located not far from Pekin and is owned wholly by Chinese. It is intended that it shall be operated after the plant is started by Chinese engineers and laborers.

The Reading Iron Co., Reading, Pa., announces an increase in wages for all employees now paid on an hourly basis, effective Feb. 15. No figures have been announced, but it is understood that the minimum rate will be 44c. Tonnage rates are not to be affected, an advance of 25c. having been made in the puddling rate on Jan. 1.

Day workers in the Riverside plant of the Carpenter Steel Co., Reading, Pa., now receiving 42½c. per hour will receive an increase of 4c. per hour, effective Feb. 15, according to notices just issued. Satisfactory adjustment will also be made in wages of employees receiving more than 42½c.

Iron and Steel Markets

PRODUCTION HOBBLED

Multiplied Embargoes Magnify Car Shortage

Prices Wild, But Subordinate to Delivery—Strong Position of Steel Trade

The obstacles to production have been heightened in the week. Numerous railroad embargoes have been piled on top of the car and fuel scarcity and the continued labor shortage. The threatening railroad strike is not calculated to dampen the eagerness of buyers not yet covered.

The result is that few producers are operating at a better rate than 80 per cent of ingot capacity. Without some betterment in car movements, activity will be curtailed not alone among pig iron melters, some of whom are even now running intermittently, but among merchant pig iron furnaces.

Meanwhile insistent buying pressure for both pig iron and steel augments the strength of prices. These are almost anything. Whereas two or three weeks ago it appeared that finished steel was temporarily remaining at the level of the first weeks of 1919, so far as the bulk of sales for second quarter delivery was concerned, now a definite level has disappeared and business is done at $5, $10 and over $25 a ton above the fixed prices of the war period.

An important feature of most of the business entered by the independent steel makers is that it is of a definite nature as contrasted with contracts which do not become actual orders until specifications are forthcoming. Thus the steel trade may be regarded as in a strong position to withstand any onslaught of pessimism.

Contrary to the general impression, the violent adverse changes in exchange looked upon to check exports to Europe are of no great concern to iron and steel exporters. Their bookings represent four to five months of the tonnage available for foreign shipments and are for countries in connection with which exchange has not suffered a great variation from the normal. Japan remains the conspicuous seeker of steel.

The independent steel makers, following their practice of committing themselves not much over three months, have been taking business at about their current capacity, while the United States Steel Corporation's statement of unfilled tonnage indicates a booking rate fully 50 per cent above capacity, with orders now in sufficient volume to carry to December.

How secondary prices are is shown in some of the week's transactions. Sheet mills which have steel-making facilities in excess of rolling capacity have sold sheet bars at $58 to $65, against a minimum of $55 last week. Forging billets are $75 per ton at Pittsburgh, or $2 higher. In structural steel a fabricator paid 4c. on 600 tons. Small orders for rails have been closed at $62 per ton. Cold finished steel bars have brought 4.50c.

Following two weeks of heavy buying in the East, pig iron has been less active. In the Central West selling is pronounced, and at Pittsburgh basic has advanced $3 to $43, Valley. One producer sold 19,000 tons at $43 and is now asking $45. Foundry and malleable grades in the Valleys have advanced fully $1. There is also active inquiry for basic at Chicago and one foundry is in the market for 15,000 tons.

Manganese ore is again higher, $1 per unit being asked for foreign grades against 80c. about two weeks ago and 50c. two months ago. Spot ferromanganese has sold at $175 to $185, delivered.

Lake interests have made heavy sales of non-Bessemer ores, much of it to Eastern furnaces. Eastern mining interests are moving slowly in fixing prices, owing to uncertainties as to costs. Shipments of Lake ores this year are estimated at 55,000,000 to 65,000,000 tons, compared with 47,000,000 tons shipped the past season.

Over 25,000 tons of structural steel work was placed in the East, including 15,000 tons awarded to the McClintic-Marshall Co. for two garment factories in New York. Over 13,000 tons was closed in Pittsburgh. Noteworthy among the fabricated steel projects are the number of steel plant extensions, including the Trumbull Steel Co., the National Rolling Mill Co., the Otis Steel Co., the Lasalle Steel Co. and the Interstate Iron & Steel Co.

A number of mills have advanced railroad spikes to 4c. and 5c., according to the size, and track bolts to 6c., base.

Higher prices are also asked on small bolts, lag screws and nuts.

Exercising war powers with one hand to get rails, the Government has sold with the other upward of 76,000 tons of rails originally intended for France. Against the $40 to $41 per ton realized, it is altogether likely they will find positions in American roadbeds at some higher figure.

Belgium has ordered 13,400 railroad cars of British builders.

Pittsburgh

PITTSBURGH, Feb. 10.

The car situation is deplorable and is not only reducing the output of pig iron, semi-finished steel and finished steel products but is holding up many thousands of tons of steel in various forms ready for shipment, but for which the mills can not get cars and the material is lying in warehouses with little chance that cars to ship it out will be available very soon. The shortage in supply of coke and coal, largely caused by the shortage in cars, is playing havoc with the operation of blast furnaces, steel and finishing mills, many being on the ragged edge and likely to close before this week ends, unless large supplies of coal and coke are received in the meantime. In the past week, many embargoes have been put on, caused largely by the heavy snow and ice and shipments everywhere are very unsatisfactory. The heavy snow storms in New York the past week have resulted in an embargo on everything for shipment East of Newark, so that New York is shut off from all supplies for the time being.

The upward movement in prices goes on with no signs yet that the crest has been reached. Some wagers have been made in a prominent club in this city that basic and Bessemer iron will cross the $50 mark before

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Feb. 10, 1920	Feb. 3, 1920	Jan. 13, 1920	Feb. 11, 1919
No. 2 X, Philadelphia‡	**$45.35**	$44.35	$44.35	$36.15
No. 2, Valley furnace†	**42.00**	40.00	39.00	31.00
No. 2, Southern, Cin'ti†	43.60	43.60	41.60	34.60
No. 2, Birmingham, Ala.†	40.00	40.00	38.00	31.00
No. 2, furnace, Chicago*	**43.00**	40.00	40.00	31.00
Basic, del'd, eastern Pa.	41.40	41.40	39.25	33.90
Basic, Valley furnace	**43.00**	40.00	37.00	30.00
Bessemer, Pittsburgh	42.40	42.40	40.40	33.60
Malleable, Chicago*	**43.50**	40.50	40.50	31.50
Malleable, Valley	**43.00**	42.00	38.00	31.50
Gray Forge, Pittsburgh	**42.40**	41.40	38.40	31.40
L. S. charcoal, Chicago	55.00	55.00	47.50	38.85
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	52.50	52.50	48.00	43.50
O.-h. billets, Pittsburgh	52.50	52.50	48.00	43.50
O.-h. sheet bars, P'gh.	**58.00**	55.00	50.00	47.00
Forging billets, base, P'gh.	**75.00**	73.00	64.00	56.00
O.-h. billets, Phila.	59.10	59.10	59.00	47.50
Wire rods, Pittsburgh	**65.00**	60.00	60.00	57.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**4.25**	3.75	3.745	3.145
Iron bars, Pittsburgh	4.00	4.00	3.50	3.50
Iron bars, Chicago	3.50	3.50	3.25	2.97
Steel bars, Pittsburgh	3.00	3.00	2.75	**2.70**
Steel bars, New York	3.27	3.27	3.27	2.97
Tank plates, Pittsburgh	3.50	3.50	2.65	3.00
Tank plates, New York	3.77	3.77	3.02	3.27
Beams, etc., Pittsburgh	2.70	2.70	2.45	2.80
Beams, etc., New York	2.97	2.97	2.82	3.07
Skelp, grooved steel, P'gh.	2.45	2.45	2.45	2.70
Skelp, sheared steel, P'gh.	2.65	2.65	2.65	3.00
Steel hoops, Pittsburgh	3.50	3.50	3.25	3.30

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Feb. 10, 1920 Cents	Feb. 3, 1920 Cents	Jan. 13, 1920 Cents	Feb. 11, 1919 Cents
Sheets, black, No. 28, P'gh.	5.00	5.00	4.35	4.70
Sheets, galv., No. 28, P'gh.	6.50	6.50	5.70	6.05
Sheets, blue an'l'd, 9 & 10.	4.25	4.25	3.55	3.90
Wire nails, Pittsburgh	4.50	4.50	4.50	3.50
Plain wire, Pittsburgh	3.50	3.50	3.25	3.25
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.35
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.35
Old Material, Per Gross Ton:				
Carwheels, Chicago	$39.00	$39.00	$36.00	$23.00
Carwheels, Philadelphia	40.00	40.00	35.00	23.00
Heavy steel scrap, P'gh.	28.00	28.00	26.00	15.00
Heavy steel scrap, Phila.	*26.00*	26.50	24.50	15.00
Heavy steel scrap, Ch'go	25.00	25.00	24.00	15.00
No. 1 cast, Pittsburgh	34.00	34.00	32.00	19.00
No. 1 cast, Philadelphia	*40.00*	41.00	35.00	23.00
No. 1 cast, Ch'go (net ton)	39.50	39.50	36.50	19.50
No. 1 RR. wrot, Phila.	**36.00**	35.00	33.00	23.00
No. 1 RR, wrot, Ch'go (net)	*36.50*	27.50	25.50	15.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$4.25
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	5.00
Foundry coke, future	7.00	7.00	7.00	7.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*19.25*	19.50	19.50	18.50
Electrolytic copper, N. Y.	*19.00*	19.25	19.25	18.00
Spelter, St. Louis	*8.65*	9.00	9.37½	6.50
Spelter, New York	*9.00*	9.35	9.72½	6.85
Lead, St. Louis	**8.50**	8.45	8.62½	4.70
Lead, New York	8.75	8.75	8.87½	5.00
Tin New York	*58.00*	59.00	65.00	72.50
Antimony (Asiatic), N. Y.	**11.50**	11.25	10.25	7.12½

June. The demand for pig iron is active, with a very limited supply, and this is true of semi-finished steel and all finished steel products. Jobbers and consumers, in their anxiety to cover, are simply putting the market upon themselves, and when the end will be reached is a question. Operating conditions are bad, and there is a loss of 15 to 20 per cent in production, due to the car and fuel shortage, while general conditions from the producer's standpoint are unsatisfactory. Labor is getting scarce, some shippers reporting that when they do get cars, they can hardly get enough men together to load them.

Ferroalloys.—The demand for ferromanganese for last half of the year is still quite active, and some sales have been closed in the past week at $160 to $165, delivered, for 76 to 80 per cent domestic. There is no ferromanganese for delivery in first half, most producers being oversold. A sale of 600 tons of domestic is reported at $160, delivered, equal shipments over last half.

We quote 76 to 80 per cent domestic ferromanganese $160 to $165 for second half delivered, with a reduction of $1.50 to $1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at $85 to $90, and 18 to 22 per cent spiegeleisen at $55 to $57.50, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, $56.50; 10 per cent, $59.50; 11 per cent, $62.50; 12 per cent, $66.10. We quote 6 per cent silvery iron, $45.75 to $46.25; 7 per cent, $50 to $50.50; 8 per cent, $52 to $52.50; 9 per cent, $54 to $54.50, and 10 per cent, $56.50 to $57. An advance of $3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of $2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of $2.90 per gross ton for delivery in the Pittsburgh district.

Pig Iron.—Basic iron has advanced squarely to $43 at Valley furnace, one interest reporting sales of 19,000 tons, mostly for delivery in second quarter, at that price, and this same interest is now holding any basic iron it may have to sell at $45, Valley furnace. Deals are on for three or four lots of Bessemer iron on the basis of $42 at Valley furnace, and at least two of these will likely be closed before this week ends. Offers of as high as $44 have been made for malleable without getting it, and plain No. 2 iron has sold at $42, Valley furnace, and possibly higher. There is no doubt that the present scarcity in the supply of basic iron has been caused largely by the diversion of so much basic iron from steel making to foundry purposes. As it is, it is very hard to find any basic iron anywhere, and the market seems likely to be higher. We note two sales of 5000 tons each of basic at $43, Valley furnace, and there have been other sales aggregating a total of probably 30,000 tons, delivery March to June. Inquiry for Bessemer is not so active as for basic. Some furnaces in the two valleys banked over Sunday in order to conserve coke for the week's operations.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being $1.40 per gross ton:

Basic	$43.00 to $44.00
Bessemer	41.00 to 42.00
Gray forge	41.00 to 42.00
No. 2 foundry	42.00 to 43.00
No. 3 foundry	40.50 to 42.00
Malleable, Valley	43.00 to 44.00

Billets and Sheet Bars.—There have been sales of sheet bars by two or three sheet mills that have more melting than rolling capacity at $58 and higher, reports being that $65 has been done, but these are not confirmed. The American Sheet & Tin Plate Co. is rolling quite a tonnage of sheet bars into sheets for customers who cannot buy sheets in the regular way, and this is allowing it to operate several of its smaller sheet mill plants that otherwise would be closed for lack of steel, the company charging so much per ton for rolling the bars into sheets. The American Sheet & Tin Plate Co. is still bringing sheet bars from Duluth to the Pittsburgh district, not being able to get nearly enough from its regular source of supply. Billets or sheet bars are very hard to find and command almost any prices. None

of the steel mills is giving the quantity of sheet bars to the customers called for in their contracts, and they are trying to find bars in other places, but with little success.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $52.50 to $55; 2 x 2-in. billets at $55 to $57; slabs, $53 to $55; sheet bars, $58 to $65, and forging billets, $75 to $78 base, all f.o.b. at mill Pittsburgh or Youngstown.

Structural Material.—The inquiry continues very active and a great deal of new work is in sight. Local fabricators report they are now very well filled up over first half. The McClintic-Marshall Co. has taken 3500 tons for buildings for the Dunlop Tire Co., 500 tons for the Aluminum Co. of America at New Kensington, Pa., and 500 tons for a sheet mill building for the Trumbull Steel Co. at Warren, Ohio. The American Bridge Co. has taken 7500 tons for a bank building in Detroit, and 1100 tons for a smelting plant in Colorado. Active work in sight includes 2000 tons for extensions for the Goodyear Tire & Rubber Co., Akron, Ohio, and 600 tons for extensions to the plant of the National Rolling Mill Co., Massillon, Ohio. Both these jobs are likely to be placed this week. The Carnegie Steel Co. is filled up on plain material, practically over the remainder of this year, and the Jones & Laughlin Steel Co. the same, except the latter is selling small odd lots occasionally that come from regular rolling schedules. We quote plain material up to 15 in. at 2.45c. to 2.70c., Pittsburgh, but both concerns naming these prices are practically out of the market.

Plates.—A leading local maker of plates retired absolutely from the market on Thursday, Feb. 5, being practically sold up for the remainder of this year, and this is also true of the Carnegie Steel Co. Most of the new business being placed in plates is going to the smaller independent mills at prices ranging from 3.50c. up to 4.25c. or higher, maker's mill. Shipbuilders are perfectly willing to pay as high as 3.50c. for plates, if they can find any mills willing to enter their orders. The demand for plates is abnormally heavy and comes from all kinds of consumers. Concerns building tank work are very busy and are placing orders at almost any prices in order to get mills to accept them. Very little is being done in the building of new steel cars, but some railroads are rebuilding cars, which give the steel car concerns a fair amount of work. The price of ¼-in. and heavier sheared plates of tank quality of the Carnegie Steel Co. is 2.65c., another leading mill has sold some plates recently at 3c. and 3.25c., but both these concerns are filled for this year. Nearly all the independent mills now quote plates at 3.50c. to 4.25c., the price depending largely on the order and the delivery.

We now quote sheared plates of tank quality, ¼-in. and heavier, at 2.65c. to 2.90c. for indefinite delivery and 3.50c. to 4.25c. by the smaller mills for delivery in two to three months or longer.

Sheets.—At present the American Sheet & Tin Plate Co. has nearly 40,000 tons of sheets and tin mill products piled up in its warehouses, awaiting cars for shipment, but with little relief in sight. Embargoes have been put on by the railroads to a number of important sheet consuming centers, the independent mills are having the same trouble to get cars, and transportation conditions are the worst ever. The average prices on sheets by the independent mills are $20 to $25 per ton higher than those of the American Sheet & Tin Plate Co., which are based on the March 21 schedule. In the prices given below the lower prices named are those of the leading interest, and the higher prices are those of the independent mills.

We now quote No. 28 gage box annealed, one-pass black sheets at 4.35c. to 5.35c.; No. 28 galvanized, 5.75c. to 6.75c., and No. 10 blue annealed at 3.55c. to 4.50c., the lower price named being the March 21 schedules.

Tin Plate.—Most tin plate mills are operating at about 90 per cent of normal capacity, being very short of steel, while others that make their own bars are operating at 100 per cent, but output of tin plate is not more than 90 per cent. Shipments are being held up in every direction by shortage of cars and embargoes. The export demand is fairly active, but most concerns are refusing to quote, being far behind in deliveries of tin plate to domestic consumers. We quote tin plate to domestic consumers for first half of this year delivery at $7 per base box and for export $8.50 to $9 per base box, Pittsburgh.

Wire Rods.—The demand is active, and local makers say they have sold about all the rods they care to sell, their output being restricted owing to shortage of steel. We note a sale of 1000 tons of soft rods, Bessemer or open-hearth at $65 at mill, 300 tons of high carbon rods at $75 and 400 tons at $100, maker's mill. We quote soft Bessemer and open-hearth rods at $52 to $65 at mill, the lower price being that of the leading interest, which is reported to be sold up on rods for some time ahead. We quote high carbon rods at $75 to $100 at mill, prices depending entirely on the carbon content.

Wire Products.—It is now stated that the leading interest is preparing a new wire nail card, and when this is ready it will be discussed with three or four other cards, prepared by the independent mills, and a new wire nail card will likely be made up from all of these. The demand for wire nails and plain wire for manufacturing purposes is still very heavy, and all the mills are very much behind in shipments. Stocks of jobbers and consumers are low, with small chances of early replenishing. We continue to quote wire nails at $3.25 to $4.25 base, and plain wire for manufacturing purposes at 3c. to 3.50c., f.o.b. mill, Pittsburgh. The lower prices named are those of the leading interest.

Iron and Steel Bars.—The Carnegie Steel Co. and the Jones & Laughlin Steel Co. are practically out of the market as sellers of steel bars for this year. Other mills report they are sold up for first half, and are discriminating very closely in new orders they are taking. It is very evident that considerable new capacity for rolling steel bars is badly needed. The demand for iron bars is also very active, one local maker reporting being sold up over first half.

We quote steel bars at 2.35c. up to 3c. and 3.50c., when rolled from billets. We quote common bars at 4c. and refined iron bars 4.25c. in carloads, Pittsburgh plus full freight to point of delivery.

Hot-Rolled Strip Steel.—Two or three local makers of hot-rolled strips say they are practically out of the market as sellers for first half delivery. Consumers are specifying freely, but output is being restricted by lack of cars. Prices show a wide range, depending on the order and the delivery wanted. We quote hot-rolled strip steel at 4.25c. to 5.50c. f.o.b. mill, Pittsburgh.

Cold-Rolled Strip Steel.—Conditions in this trade are the same as noted above in hot-rolled strips. Mills are sold up for first half and are very much back in shipments. Prices are strong and for early delivery sellers can get almost any figures they name. We quote cold-rolled strip steel at 7c. to 9c. per lb., the price depending on the order and the delivery wanted.

Cold-Rolled Steel Bars.—The demand is abnormally heavy, coming largely from the automobile builders, two local makers reporting they are sold up for first half and out of the market. We quote cold-rolled steel bars at 3.85c. to 5c. at mill.

Spikes.—The demand for all kinds of spikes is very active and makers are pretty well sold up over first half. The Baltimore & Ohio Railroad has bought about 5000 kegs and another road about the same quantity. The demand for boat and barge spikes is heavier now than for some months.

We quote standard spikes, 9/16 x 4½ in., at $3.60 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ⅝ in. and 7/16 in, $4.25; 5/16 in., $5; boat and barge spikes, $4.25, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Nuts, Bolts and Rivets.—Makers report the demand very heavy and two or three makers are now refusing to quote specific prices but are taking orders subject to prices ruling at time of shipment. The demand for rivets is active, most sellers quoting $4.15 for structural and ship rivets and $4.25 for large boiler rivets.

Boiler Tubes.—Several makers report that on merchant and boiler tubes and also on seamless tubes they are sold up for four to six months. One leading maker

of charcoal iron tubes reports having all the orders it can fill up to October. Discounts on steel and iron tubes are given on page 510.

Iron and Steel Pipe.—Conditions in this trade are the same as reported for many weeks past. Four or five of the largest makers of steel pipe are not quoting, except on rare occasions to regular customers for definite delivery, being practically filled on all the steel pipe they can turn out for this year. Every day new inquiries come into the market for gas and oil lines. These are put up to the mills, which refuse to quote, stating they are so badly congested they cannot possibly make the delivery. The demand for iron pipe is also abnormally heavy, two local mills reporting they are sold up on all they can make for four to six months. The present abnormal demand for tubular goods, and especially for oil well supplies, promises to last for several years. Discounts on iron and steel pipe are given on page 510.

Coke.—The car supply is low and coke producers are loud in their denunciation of the way the Government is handling the railroads and are eager for the time to come when they will be returned to private ownership. On some days last week the supply of cars in the Connellsville coke regions was only about 25 per cent of normal. Labor is getting scarce and coke producers say that when they do get a supply of cars, which is not often, they have trouble in finding labor to load them. Deliveries of coke are bad and many blast furnaces and manufacturing plants are on the ragged edge, both for coal and coke. The demand for spot furnace coke is very active, but very little is being sold, producers applying their entire output of coke on contracts. Government prices are still in effect, these being $6 per ton for spot and future furnace coke, and $7 per ton for spot and future 72-hr. foundry coke in net tons at oven.

Old Material.—Local conditions in the scrap trade are quiet, largely for the reason that dealers are not anxious to sell, being certain they will get higher prices in the near future. There is considerably more activity in scrap consuming centers, such as Cleveland, Youngstown and other places than in the Pittsburgh district. Prices remain very firm, but are not materially higher than last week.

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$28.00 to $29.00
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	34.00 to 35.00
Compressed steel	24.00 to 25.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Ptitsburgh district	19.00 to 20.00
Bundled steel stamping	18.00 to 19.00
No. 1 busheling	24.00 to 25.00
Railroad grate bars	24.00 to 25.00
Low prosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	32.00 to 33.00
Railroad malleable	26.00 to 27.00
Iron car axles	34.00 to 35.00
Locomotive axles, steel	33.00 to 34.00
Steel car axles	31.00 to 32.00
Cast iron wheels	33.00 to 34.00
Rolled steel wheels	27.00 to 28.00
Machine-shop turnings	18.00 to 18.50
Sheet bar crop ends (at origin)	30.00 to 30.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	25.00 to 26.00
Cast iron borings	20.50 to 21.00
No. 1 railroad wrought	28.00 to 29.00

The stockholders of the Clinton-Wright Wire Co., Worcester, Mass., have ratified the merger of that company with the Wickwire Steel Co., and approved the change of the name of the corporation to the Spencer-Wickwire Steel Corporation. They voted to retire the Clinton-Wright 7 per cent first preferred and 8 per cent preferred shares, to reduce the par value of the common shares to $5, to issue $7,500,000 8 per cent preferred stock and $12,500,000 bonds, which already have been offered for public subscription.

Buffalo

BUFFALO, Feb. 10.

Pig Iron.—Owing to many Buffalo furnaces having sold heavily the week of Feb. 2 there was not a great deal of iron sold last week. One furnace sold 4500 tons of foundry and basic at $43 base for foundry and $41 for basic. Another interest sold a few thousand tons at $43, base price. Other furnaces are out of the market, being sold through to the end of the third quarter. All furnaces have established $45 as the base price for foundry on new business. The Rogers-Brown company is now operating its third furnace, which had been out since the time of the strike.

We quote f.o.b. furnace Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	$44.00 to $48.00
No. 2X, 2.25 to 2.75 sil.	44.25 to 46.25
No. 2 plain, 1.75 to 2.25 sil.	41.00 to 45.00
Malleable, silicon not over 2.25 nom.	44 25
Basic	43.00
Lake Superior charcoal, according to grades, f.o.b. Buffalo	58.00 to 60.00

Old Material.—Scrap market shows a softening tendency, with no great amount of trading, and such as there is is hampered by car and labor shortage. Eastern Pennsylvania mills are the only ones interested, but slack conditions are believed only temporary. Mills are believed to be low in scrap. Stock dealers are busy endeavoring to ship.

We quote dealers' asking prices, per gross ton f.o.b., Buffalo, as follows:

Heavy melting steel, regular grades	$27.00 to $28.00
Low phos., 0.04 and under	32.00 to 33.00
No. 1 railroad wrought	31.00 to 32.00
No. 1 machinery cast	38.00 to 39.00
Iron axles	40.00
Steel axles	40.00
Car wheels	37.00 to 38.00
Railroad malleable	31.00 to 32.00
Machine-shop turnings	17.50 to 18.00
Heavy axle turnings	21.00 to 22.00
Clean cast borings	20.00 to 21.00
Iron rail	30.00 to 31.00
Locomotive grate bars	24.00 to 25.00
Stove plate	29.00 to 30.00
Wrought pipe	20.00 to 21.00
No. 1 busheling	22.00 to 23.00
Bundled sheet stamping	19.00 to 20.00

The Pittsburgh District

At Pittsburgh last week the Westinghouse Electric & Mfg. Co. entered suit in the United States District Court to recover from the Government approximately $950,000, which the company says represents the principal and interest of a munition manufacturer's tax paid under protest to Collector of Internal Revenue C. G. Lewellyn, in charge of the Pittsburgh district. The plaintiff alleges that it should not be held liable for the tax because the work in question was done for the Washington Steel & Ordnance Co., the American Steel Foundries and the British Government, which owned the material. The manufacture of projectile and shell casing during the war is the work referred to.

The Pittsburgh Steel Co., Union Arcade, Pittsburgh, sends out a statement, showing sales for the six months ended Dec. 31, last, as $11,236,502.73, compared with $17,624,443.38, compared with the same period in 1918, a decrease for the 1919 period of $6,387,940.65. Net profits for the last six months of 1919 were only $50,725.68, a decrease of $762,526.29, compared with the last six months of 1918. This large falling off in profits in the last six months of 1919 was due almost entirely to the steel strike, which took place in that period.

The American Radiator Co., Pittsburgh, has bought the property of the Superior Mfg. Co. on the North Side in that city, for the reported price of $75,000. The American Radiator Co. will use this property as a Pittsburgh distributing warehouse. It contains about 8,000 square feet and is improved with a four-story manufacturing building, and has a direct switch from the Pittsburgh, Fort Wayne & Chicago Railway.

Chicago

CHICAGO, Feb. 10.

The railroad situation, already bad enough, will become a much more serious factor in the iron and steel business if the threatening strike of railroad maintenance of way employees takes effect next week. The output of furnaces and mills, which is now curtailed on account of a shortage of fuel, would suffer further reduction, and in the event that the maintenance employees are joined by the four major brotherhoods, would probably be cut down more drastically than during the steel strike of last fall. So far, the car shortage, which in itself is a serious problem, has affected the leading interest to a greater extent than the independents, its idle blast furnaces now totaling 10. The foremost merchant iron producer is rapidly approaching the point where it also will be forced to curtail operations and a similar situation exists at other plants in this district. Producers are impeded not only by transportation difficulties but by a shortage of unskilled labor. One important mill is short 20 per cent of its normal force and some others are not much better off.

Two of the smaller interests in this district have raised wages in conformity with the 10 per cent advance recently announced by the Steel Corporation and other plants are expected to do likewise.

The price tendency is still upward and in fact seems to be gaining in strength with the growing disparity between the supply and the demand. Small lots of plates for second quarter delivery have been bought in this market at 3.75c. Pittsburgh. About 3000 tons of slabs for second quarter shipment were recently purchased by an Eastern plate mill at $55 per ton, Chicago. An exporter has offered $70 per ton, f.o.b. Works, for from 3000 to 5000 tons of sheet bars for second quarter shipment, and his tender is being seriously considered. Small tonnages of shapes and mild steel bars have been sold at 3.25c. and 4.25c. Pittsburgh respectively and a few small orders for rails were recently closed by an Eastrn mill at $62 Pittsburgh. Sheets are unobtainable but would no doubt command much higher prices if the mills were willing to quote. Cast-iron pipe is selling in some instances at $2 above the recent advance.

Pig iron is also advancing concurrently with a revival in inquiry. Scrap has declined as a result of the situation in the stock market and the prospective transportation tie up.

Railroad interest in new equipment is confined largely to motive power. The El Paso & Southwestern and the Florida East Coast have ordered 10 locomotives each from the American Locomotive Co. The Southern Pacific has purchased two electric locomotives from the Baldwin Locomotive Works, while the Norfolk & Western and the Kentucky & Indiana Terminal have ordered three switch engines each from the same builder. The Soo Line is in the market for five switchers and the South Manchurian Railway, China, is inquiring for 15 engines.

Pig Iron.—Both inquiries and sales have increased, while prices have continued to move upward. A large steel foundry interest is in the market for 15,000 tons of basic for last half delivery. A gray iron melter is inquiring for 4000 to 5000 tons of foundry for second quarter and last half shipment. Numerous 500-ton and 1000-ton inquiries are also current. The aggregate business of individual sellers is in some cases a substantial figure. One sales office disposed of 17,000 tons within the past week. A Minnesota melter recently purchased 500 tons of Ohio foundry, subject to $7 freight, at $42, furnace, delivery to be over the last three quarters. This sale is probably explained by the temporary shutdown of the Duluth furnace for repairs. Several sales of Soo foundry have been closed at $44, furnace, for last half shipment. Although the two leading Southern makers of foundry are still on a $40 base, other furnaces in that territory are asking two dollars more. Malleable for second quarter delivery is available at $45, Valley furnace. The leading Northern interest is not yet able to take business freely, but is accommodating old customers where it can at $43, furnace, for No. 2 foundry delivered during the last half. This maker is no longer able to offer any spot iron. The Wisconsin Steel Co., which has been employing one furnace on standard Bessemer for general sale, has taken about all the business it can handle for the remainder of the year. Silveries have advanced $2.50 per ton, the present price being $53, furnace, for 7 per cent material. Charcoal iron now commands from $55 to $58 base, furnace, and makers are selling for first half delivery only in emergency cases, while for last half their bookings are so heavy that they are quoting to no one except their regular trade. Copper free low phosphorus is selling at a minimum of $48, Ohio furnace.

The following quotations are for iron delivered at consumer's yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average, sil. 1.50 (other grades subject to usual differentials), delivered at Chicago	$57.50 to $60.50
Northern coke No. 1, sil. 2.25 to 2.75	45.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	43.00
Northern high phos. foundry	43.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25	48.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75	46.60
Southern foundry, sil. 1.75 to 2.25	45.00
Malleable, not over 2.25 sil.	43.50
Basic	39.00
Low phos. (copper free)	48.00
Silvery, 7 per cent	$56.40 to 56.80

Ferroalloys.—Ferromanganese has advanced to $170 delivered; 50 per cent ferrosilicon to $90 delivered, and spiegeleisen to $60, furnace.

We quote 80 per cent ferromanganese at $170 delivered; 50 per cent ferrosilicon at $90 delivered; spiegeleisen, 18 to 22 per cent, $60 furnace.

Plates.—New business is confined to small tonnage taken by the smaller independents at generous premiums. Several orders for heavy plates, involving 100 tons or less, were recently booked by a Buffalo mill for second quarter delivery at 3.75c., Pittsburgh. The leading interest will furnish 1000 tons on contract to the Mount Vernon Car Mfg. Co. for the repair of Baltimore & Ohio freight cars. The purchaser of 1000 ore cars by the Great Northern Railroad, which was expected to be closed last week, was postponed until the current week. Eastern plate mills are still scouring this market for slabs, a recent order for 3000 tons having been closed on the basis of $55, Chicago, for delivery in the second quarter.

Mill quotation is 2.65c. to 3.75c. Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 2.67c. for plates out of stock.

Structural Material.—With the leading interest out of the market and the foremost local independent nearly so, such sales of shapes as are being made are largely confined to the jobbers and outside mills, although they, too, are unable to sell freely. A few transactions involving small tonnages have been closed in this district by Eastern makers at 3.25c. to 8.50c., Pittsburgh. Fabricators are being hampered in their operations by delays in deliveries from the mills. The car shortage is not only holding up the movement of material but has forced certain Eastern mills, notably Bethlehem and Carnegie, to curtail production. Because of the scarcity of shapes, as well as heavy bookings ahead, fabricators are turning away all except very attractive business. One large interest has been forced to reject new work, although its shops could take care of more work if the steel were available. Recent awards include:

Railroad Administration, Illinois Central, through plate girder spans, Center Grove, Iowa, 178 tons, to American Bridge Co.

Railroad Administration, Chicago & Northwestern, bridges, 1831 tons, to Wisconsin Bridge & Iron Co.

Alaska Northern Railroad, Susitna River Bridge, Alaska, 1650 tons, to American Bridge Co.

Interstate Iron & Steel Co., addition to furnace building and furnace binders, South Chicago, 500 tons, to Lackawanna Bridge Co.

Current inquiries include:

A. Starr Best Co. Building, Randolph and Wabash streets, Chicago, 1100 tons.

Commerce Building, Des Moines, Iowa, 600 tons.

Lunkenheimer Co., Cincinnati, foundry, 500 tons.

American Thermos Bottle Co., plant, Huntington, W. Va., 550 tons, bids asked by Arnold Co., Chicago.

Maibohm Motors Co., Sandusky, Ohio, plant extension, 450 tons.
Mount Vernon Car Mfg. Co., Mount Vernon, Ill., truck shop, 400 tons.
Union Station, St. Paul, Minn., waiting concourse, 400 tons.
Handley-Knight Co., foundry, Kalamazoo, Mich., 260 tons, bids asked by Mills, Rhines, Ballman & Nordhoff, Toledo.
Pingree, Idaho, Sugar Co., Preston, Idaho, mill building, 250 tons.

The mill quotation is 2.45c. to 3.50c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for materials out of warehouse.

Bars.—Although mild steel bars are exceedingly scarce, a minor India interest recently booked a few small orders for delivery at mill's convenience at 4.25c., Pittsburgh. Mills rolling iron and rail-carbon steel bars are well filled with little remaining tonnage to offer. Most current orders are being closed on the basis of selling price at time of shipment, deliveries for February are being invoiced, in most instances, at the prices quoted below. One rail-carbon mill now has commitments which will employ its capacity until the end of September.

Mill prices are: Mild steel bars, 2.35c. to 4.25c. Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.50c. to 3.75c., Chicago; rail carbon, 3.25c. to 3.50c., mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Sheets.—The famine in sheets continues to bring out offers of premiums. Consumers desiring third-quarter delivery are willing to pay as high as 8c., Pittsburgh, for galvanized, 6.50c. for black and 5.75c. for blue annealed.

Mill quotations are: 4.60c. to 4.85c. for No. 28 black; 3.80c. to 4.05c. for No. 10 blue annealed, and 5.95c. to 6.20c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago.

Wire Products.—The unsatisfactory transportation situation continues to impede shipments, but mill operation is steadily growing better. For mill prices see finished iron and steel, Pittsburgh, page 510.

Rails and Track Supplies.—An inquiry for 3000 tons of rails for 1921 delivery was recently received in this market, but was not entertained. An Eastern mill recently booked several small lots of rails aggregating a few hundred tons at $15 above the corporation's quotation. The leading interest's bookings in tie plates will employ its local capacity for six or eight months. Iron tie plates have advanced to 3.75c.

Standard railroad spikes, 3.35c. to 3.60c. Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and iron angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.75c., f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Old Material.—Scrap has weakened in sympathy with the decline in the stock market. There has been little activity except for a reported sale of heavy melting at $26 and a few sales of rolling mill grades at reduced prices. Railroad lists are light. The Northern Pacific offers 1200 tons, the Pere Marquette 600 tons, the Wabash 800 tons, the Soo Line 400 tons and the Michigan Central and Lake Erie & Western, blind lists.

We quote delivery in consumer's yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$33.00 to $34.00
Relaying rails	40.00 to 50.00
Car wheels	39.00 to 40.00
Steel rails, rerolling	35.00 to 36.00
Steel rails, less than 3 ft.	30.50 to 31.00
Heavy melting steel	25.00 to 26.00
Frogs, switches and guards, cut apart	25.00 to 26.00
Shoveling steel	25.00 to 25.50
Low phos. heavy melting steel	28.00 to 29.00
Per Net Ton	
Iron angles and splice bars	$31.00 to $32.00
Steel angle bars	25.50 to 26.00
Iron arch bars and transoms	31.25 to 32.25
Iron car axles	37.00 to 38.00
Steel car axles	34.50 to 35.00
No. 1 busheling	20.50 to 21.50
No. 2 busheling	15.00 to 15.50
Cut forge	24.50 to 25.00
Pipes and flues	20.50 to 21.00
No. 1 railroad wrought	26.50 to 27.50
No. 2 railroad wrought	24.50 to 25.00
Steel knuckles and couplers	26.50 to 27.00
Coil springs	28.50 to 29.00
No. 1 cast	39.50 to 40.00
Boiler punchings	26.50 to 27.00
Locomotive tires, smooth	26.50 to 27.00
Machine shop turnings	14.50 to 15.00
Cast borings	14.50 to 15.50
Stove plate	32.50 to 33.00
Grate bars	32.00 to 33.00
Brake shoes	26.50 to 27.50
Railroad malleable	30.25 to 31.25
Agricultural malleable	30.25 to 31.25
Country mixed	19.00 to 20.00

Bolts and Nuts.—The car shortage and numerous embargoes have interfered with both shipments and receipts of raw material. Operation shows no improvement and the already heavy demand has been further accented by increased inquiries by the railroads. An advance in prices is looked for. For mill prices see finished iron and steel, Pittsburgh, page 510.

Jobbers quote: Structural rivets, 4.97c.; boiler rivets, 5.07c.; machine bolts up to ⅞ x 4 in., 35 and 5 per cent off; larger sizes, 25 and 5 off; carriage bolts up to ⅞ x 6 in., 30 off; larger sizes, 20 off; hot pressed nuts, square tapped and hexagon tapped, $1.45 off; coach or lag screws, gimlet points, square heads, 40 and 5 per cent off. Quantity extras are unchanged.

Cast-iron Pipe.—Pipe is strong, some sales of small pipe, 12-in. and under, having been made at $2 above the prices quoted below. Chicago will take bids on 4650 tons on Feb. 16. The United States Cast Iron Pipe & Foundry Co. is low bidder on 2330 tons for Akron, Ohio, and has been awarded 620 tons for Fort Wayne, Ind. Great Falls, Montana, has let 1560 tons to the American Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $72.80; 6-in. and above, $69.80; class A and gas pipe, $2 extra.

Cincinnati

CINCINNATI, Feb. 10.

Pig Iron.—The past few days have brought a lull in the feverish buying of pig iron witnessed during the previous fortnight, and while inquiry is still fairly heavy, there has been a noticeable falling off in sales reported. Consumers in this territory are pretty well covered for first half needs, and while some have contracted for the last half, there is a tendency to hold off buying until later. The largest sales reported are one of 1000 tons to a Kentucky melter, and another of 850 tons to an Indiana consumer, most of the business in this territory being confined to lots from one carload up to 500 tons. With the heavy tonnages booked by Northern furnaces during the recent activity, consumers are now looking to Southern furnaces to take care of their wants. Southern foundry, silicon 1.75 to 2.25, has been sold in this territory during the week at $42, Birmingham, and this price is being quoted by a number of furnaces for the first half, but at least two of the larger interests are still taking on business for the rest of the year at $40, though they have only a limited tonnage to offer for the first half at this figure. Considerable tonnages of Southern iron have been disposed of during the week to melters in northern Ohio and Michigan. One interest in southern Ohio, which recently booked a large tonnage of foundry grades at from $41 to $43.50 base grade, has advanced its price to $45, and has reported a sale of about 400 tons at that figure. There is still considerable inquiry for basic before the market, one being for about 5000 tons, but up to date none of this has been booked, melters considering the price quoted, $43 furnace, too high. Malleable has been active during the week, most of the inquiry coming from the automobile plants in Michigan, and a sale of about 3000 tons is reported to a prominent Detroit manufacturer at slightly over $45 furnace. Silvery furnaces in Jackson County are reported to be unwilling to take on heavy tonnages for future delivery at the present price, and it is rumored here that an advance is scheduled. The car shortage is still seriously handicapping furnace operations in southern Ohio, though none of them has been forced to bank. The movement of box cars to the Northwest for grain handling purposes is expected to further aggravate the situation. Coke shortage is very pronounced locally, and some foundries are threatened with a shutdown unless speedy relief is secured.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$43.60 to $45.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	44.85 to 46.85
Ohio silvery, 8 per cent sil.	54.30
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	43.80 to 45.80
Basic, Northern	40.40
Malleable	42.80 to 43.80

Finished Material.—The market for finished material is in a somewhat chaotic condition. Price changes

are so numerous that jobbers have given up quoting. While some steel bars are coming through on orders placed in November, mills are refusing to book new business until some of that now written has been delivered. A customer of one of the biggest jobbers in this city has been waiting for two months to get an order for 2000 tons of structural steel on the books of one mill. So far he has been unsuccessful, and the jobber can hold out no hope for the future. Jobbers here have withdrawn all quotations, and are only taking on new business subject to prices ruling at time of shipment. Sheet mills in this vicinity are being badly handicapped by the shortage of cars, and the Newport Rolling Mills has wired the representative of that district in Washington protesting against the diverting of cars from this vicinity. Conditions are so bad that unless speedy relief comes the mills will be forced to close down. The Whitaker-Glessner mills at Portsmouth are reported to be getting a fairly good supply of cars, and are running pretty well up to normal. Mills in this territory are reported to be refusing new business, and will not open their books until contracts now several months overdue are filled. Local jobbers are receiving very scant supplies of sheets, and while they quote nominally 5½c. for black and 7c. for No. 28 galvanized, they have none to offer, as they are in the same position as the mills, still delivering on old contracts. Wire nails show no improvement, and while jobbers are swamped with inquiries offering big premiums, they are unable to accept them, as they are only receiving one car at a time, and these are apportioned among their regular customers. No improvement is looked for until the weather in the Northern and Eastern part of the country moderates and laborers at the mills make up their minds to think more about the interests of their employers than of past differences among themselves.

Old Material.—The scrap market during the week developed some weakness, and prices on several lines have been marked down $1 a ton. This is particularly true of rolling mill scrap, foundry grades being quoted the same as last week. Local foundries are purchasing only to fill their immediate needs, and most of the scrap gathered in this district is being shipped to outside points.

Per Gross Ton	
Bundled sheet	$16.00 to $17.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	44.00 to 45.00
Rerolling steel rails	30.00 to 31.00
Heavy melting steel	22.00 to 23.00
Steel rails for melting	24.00 to 25.00
Car wheels	29.00 to 30.00
No. 1 railroad wrought	26.00 to 27.00
Per Net Ton	
Cast borings	$13.50 to $14.00
Steel turnings	12.00 to 12.50
Railroad cast	30.00 to 31.00
No. 1 machinery	33.00 to 34.00
Burnt scrap	20.00 to 21.00
Iron axles	29.50 to 30.00
Locomotive tires (smooth inside)	23.50 to 24.50
Pipes and flues	17.00 to 17.50
Malleable cast	23.00 to 23.50
Railroad tank and sheet	16.00 to 16.50

Birmingham

BIRMINGHAM, ALA., Feb. 9.

Pig Iron.—At the close of the first week in February, Alabama pig iron was selling at five different prices, $38, $40, $41, $42.50 and $43. The leading interest, which cuts small figure in the foundry market, was selling limited quantities of accumulated stocks at $38. An extreme northern Alabama interest, which enjoys a freight advantage over Birmingham and manufactures a high phosphorus iron taken by Northern consumers for mixture with Northern irons on account of its fluidity, was selling at $42.50 and $43, according to reliable report in iron trade circles. One Birmingham district maker sold lots ranging from carloads to 250 and 500 tons at $41 and $42, according to freight charges and the like. The largest foundry producers were still selling for all delivery at $40, the major portion of the new business being for second and third quarters, with some lapping over through the second half. One interest sold 25,000 tons on the $40 basis between Feb. 2 and 6. Recent bookings have been decidedly the largest since November, and the largest tonnage went at $40. At the close of the first week, the larger foundry interests were still on a $40 base, but two of them admitted looking for higher levels for most of second half business and said they were in no hurry to fill for that period at the $40 level. The output will grow according to availability of raw material and labor. Steel works are booked far ahead and are parcelling out the output in strenuous effort to satisfy customers, none getting a full quota.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

Foundry, sil. 1.75 to 2.25	$40.00
Basic	39.00
Charcoal	50.00

Coal and Coke.—The coal output continues around normal. Foundry coke remains at maximum Government levels, $9.30 to $10.30, with eager demand for output.

Old Material.—The flurry in Wall Street was reflected by the scrap market, which, after several weeks of activity, went stagnant. No price recessions have been granted, but business has taken a sleep for the time being. We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$22.00 to $22.50
No. 1 heavy steel	22.50 to 23.00
Cast iron borings	14.00 to 15.00
Machine-shop turnings	14.00 to 15.00
Stove plate	25.00 to 26.00
No. 1 cast	28.00 to 29.00
Car wheels	28.00 to 29.00
Tramcar wheels	27.00 to 28.00
Steel axles	29.00 to 30.00
No. 1 wrought	24.00 to 25.00

St. Louis

ST. LOUIS, Feb. 9.

Pig Iron.—Buying of pig iron slowed up somewhat during the week just passed, although a considerable number of inquiries remain in the market and some new ones have appeared. The buying more recently has been about equally divided between prompt and last half shipment, with the industry apparently inclined to wait a bit before committing itself further in any large degree. This applies to both sides of the case. The prevailing prices are: For No. 2 Southern, $42 per ton Birmingham basis, $43 to $44 Ironton basis and about $43.50 local furnace. The car shortage is having some effect on deliveries and interfering to that extent with operations of melters who have allowed their stocks to run low.

Coke.—Practically nothing has been done in coke during the week, the consumers being unable to make purchases or to get any assurance of when they may expect a loosening of the market. Representatives report inability to get any coke for customers other than that which has already been contracted for.

Finished Iron and Steel.—Very little change has been noted during the past week in the finished products market, and mill representatives are still working under the instructions received previously not to enter any new business. Specifications, however, continue to be received, although the car shortage is interfering still more seriously with the deliveries. The warehouses report business offering in excess of their capacity to handle from stock, with supplies slow in coming from the mills. In consequence many orders placed are standing on the deferred list.

For stock out of warehouse we quote as follows: Soft steel bars, 3.44c.; iron bars, 4.09c.; structural material, 3.54c.; tank plates, 3.74c.; No. 10 blue annealed sheets, 5.34c.; No. 28 black sheets, cold rolled, one pass, 6.60c.; No. 28 galvanized black sheet gage, 8.10c.

Old Material.—The scrap market is in a feverish condition due to the foreign exchange and stock market troubles which are being reflected in the operations of the old material dealers. In consequence, although there is little quotable change in the prices, there is a softening tendency, the absence of transactions preventing the making of new figures. The rolling mills, steel mills and foundries are inclined to play a waiting game because of the situation, although buying would be done if conditions were more stable. Lists out during the week include the following: Missouri, Kansas & Texas, 1400 tons; Frisco, 400 tons; Terminal Association, 350 tons, while the Missouri Pacific sold about 350 tons at private sale. Cast-iron grades generally are

showing the stronger tendencies, but even they are relatively inactive.

We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

	Per Gross Ton	
Old iron rails	$31.50 to	$32.00
Old steel rails, rerolling	33.50 to	34.00
Old steel rails, less than 3 ft.	30.50 to	31.00
Relaying rails, standard sections, subject to inspection	45.00 to	50.00
Old car wheels	33.50 to	34.50
No. 1 railroad heavy melting steel	26.50 to	27.00
Heavy shoveling steel	23.50 to	24.00
Ordinary shoveling steel	23.00 to	23.50
Frogs, switches and guards, cut apart	27.00 to	27.50
Ordinary bundled sheets	16.00 to	16.50
Per Net Ton		
Heavy axle and tire turnings	19.00 to	19.50
Iron angle bars	28.00 to	28.50
Steel angle bars	24.50 to	25.00
Iron car axles	38.00 to	38.50
Steel car axles	35.00 to	35.50
Wrought arch bars and transoms	32.50 to	33.00
No. 1 railroad wrought	26.50 to	27.00
No. 2 railroad wrought	25.00 to	25.50
Railroad springs	24.50 to	25.00
Steel couplers and knuckles	25.00 to	25.50
Locomotive tires, 42 in. and over, smooth inside	25.50 to	26.00
No. 1 dealers' forge	23.00 to	23.50
Cast iron borings	15.00 to	15.50
No. 1 busheling	23.00 to	24.00
No. 1 boiler, cut to sheets and rings	19.00 to	19.50
No. 1 railroad cast	35.50 to	36.00
Stove plate and light cast	30.50 to	31.00
Railroad malleable	26.50 to	27.00
Agricultural malleable	26.00 to	26.50
Pipes and flues	20.50 to	21.00
Heavy railroad sheet and tank	20.00 to	20.50
Railroad grate bars	30.00 to	30.50
Machine-shop turnings	15.50 to	16.00
Country mixed	22.50 to	23.00
Uncut railroad mixed	23.50 to	24.00
Horseshoes	24.00 to	24.50

Boston

BOSTON, Feb. 10.

Pig Iron.—The market is much less active, sales for the past week amounting to less than 15,000 tons. Two New Hampshire and one local consumer want a large tonnage of high silicon iron, second half delivery, but foundries in general are well covered through June 30. The bulk of the Buffalo iron sold during the past week brought $40 furnace, second half delivery. The market to-day is higher, sales of silicon 1.75 to 2.25 being put through at $45 furnace, first half delivery. Pennsylvania iron has sold at $42 to $44 furnace base, with late sales, last half, at or near the top price, which represents an advance of $1 per ton. The Virginia Iron, Coal & Coke Co. is out of the market, but Virginia iron has sold and is offered in a small way at $40 to $41 furnace. Alabama has sold slowly, and quotations remain unchanged. The Sloss-Sheffield company is out of the market on first quarter iron, except on special analysis. The Bridgeport District Salvage Board offers by negotiation 414,662 lb. basic and 26,557 lb. low phosphorous, located at the Penn Seaboard steel plant, New Haven, Conn. Delivered pig iron prices follow:

Eastern Pennsylvania silicon, 2.25 to 2.75	$46.15 to	$48.15
Eastern Pennsylvania silicon, 1.75 to 2.25	44.90 to	46.90
Buffalo silicon, 2.25 to 2.75	49.15 to	50.15
Buffalo silicon, 1.75 to 2.25	47.90 to	48.90
Virginia silicon, 2.25 to 2.75	45.95 to	47.95
Virginia silicon, 1.75 to 2.25	44.70 to	46.70
*Alabama silicon, 2.25 to 2.75		47.35
*Alabama silicon, 1.75 to 2.25		45.75

*Alongside Boston prices.

Finished Iron and Steel.—The lack of coal at the mills, railroad embargoes, car and labor shortage have slowed up the movement of finished iron and steel into New England during the past week. Local mill representatives say their companies are sold up to or through June 30, next, and therefore they can accept only a very limited tonnage. The Bethlehem Steel Corporation has advanced structural $5 a ton, and some of the smaller independents have taken similar action. Structural erecting charges have advanced 10 per cent. The Kellogg Structural Steel Co. is awarded 300 tons on local jail work. The New England Structural Co. is awarded the structural for a three-story General Electric, Lynn, plant addition, and an East Mattapan State Hospital dining-room, both involving a small tonnage which will be filled from stock. The following tonnages are open for competition: 1300 tons, Gilbert & Barker Mfg. Co., Springfield, Mass.; Massachusetts Bonding building, Boston, 500 tons; a Boston garage, 1700 tons; Lowell, Mass., Memorial building, 550 tons, and high school, 300 tons; New Bedford, Mass., ten-story office building, 200 tons. Stone & Webster are figuring on a Saginaw, Mich., power plant, 800 to 1000 tons. The Vermont Marble Co. took bids early in the week on its 1920 expansion budget, 900 tons. The New Haven Railroad has bought 12,000 tons of rails from the Lackawanna Steel Co. Some mills will accept limited plate orders on ⅛ in. stock and larger. Smaller sizes have sold in a limited way at $4.50 f.o.b. Pittsburgh. One 500-ton tank job has been turned down here, as well as several smaller ones. The Bath Iron Works has a contract to build six large marine boilers. Sheets are scarce, especially galvanized. One mill is making monthly prices on the following, f.o.b. Pittsburgh base, effective to March 1: blue $4.05, galvanized $6.20, black $4.85. A local contracting firm is in the market for 1000 tons concrete bars, a western Massachusetts carriage company wants 200 tons rounds, bands, etc., and a burlap manufacturer 800 tons assorted soft steel, etc., for its Calcutta plant. Local bar quotations are mainly nominal, hardly any business being booked.

Warehouse Business.—Some local warehouse stocks of steel have evaporated. Efforts to borrow stocks from other firms are succesful only occasionally. The iron supply situation is less acute, but serious nevertheless. Supplies of sheets are smaller than they have been before within the memory of most houses. Expansion bolts have been advanced 20 per cent. Galvanized nails have gone up another 50c. per keg to a $11 base, making a net advance for the past month of $1. Wire and cut nails are unobtainable except in one-keg lots and then only at fancy premiums.

Jobbers quote: Steel bars, cold rolled rounds, $6 per 100 lb. base; squares, hexagons, flats, $6.50 base; soft steel, flats, rounds, squares, $4.25 base; concrete bars, plain round, square, $4.25; twisted squares, $4.75; structural steel under 3 in., $4.25; structural, 3 in. and over, $4; tire steel, $4.95; spring steel, open hearth, $8.75; special, $12.75; toe calk steel, $6.25; steel hoops, $6.45; steel bands, $5.45; iron, refined, except as follows: $4.50 base; ½ in., 9/16 in. round, square, and 2⅝ in. round, square and larger, $4.90 base; 7/16 in. round, square and smaller, $5.50 base; over 6 in. wide, $5.50 base; best refined iron, $5.50 base; Wayne iron, $7 base; band iron, $5.45; hoop iron, $6.45; Norway iron, $20; No. 10 blue annealed sheets, $5.55 base; No. 28 black sheets, $7.65; No. 28 galvanized sheets, $8.50; plates, $4.80 base.

Old Materials.—Early in the week, dealers paid $23.65 for No. 1 heavy melting steel, but since then the market has dropped about $1, with offerings materially increasing. One dealer offers 1000 tons at $22.50, and another 500 at $23. Another dealer bought more than 11,000 tons against contracts. As high as $30 was paid for No. 1 railroad wrought, but the market to-day is $1 to $2 lower. Almost no yard wrought has sold and prices are largely nominal. Wagon and cart tires, for export, brought $31 to $32 delivered seaboard, and a New York state buyer took three cars of horseshoes at $31.50 to $32.50 delivered. One dealer practically cleaned up the local malleable market at $28 to $29. Foundries are buying little machinery cast these days, but prices are higher because of weather conditions. Pennsylvania buying of turnings has advanced prices, and chemical borings bring more money, but the market on both is by no means active. Yard quotations are:

No. 1 heavy melting steel	$22.50 to	$23.00
No. 1 railroad wrought	28.00 to	29.00
No. 1 yard wrought	23.50 to	24.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	20.50 to	21.50
Machine shop turnings	16.00 to	17.00
Cast iron borings	18.50 to	19.50
Heavy axle turnings	20.00 to	21.00
Blast furnace borings and turnings	14.00 to	15.00
Forged scrap	16.50 to	17.50
Bundled skeleton	16.00 to	17.00
Steel car axles	31.00 to	32.00
Car wheels	37.00 to	38.00
Machinery cast	37.00 to	38.00
No. 2 cast	35.00 to	36.00
Stove plate	26.00 to	28.00
Railroad malleable	28.00 to	29.00
Rerolling rails	29.00 to	30.00

Cast Iron Pipe.—Pipe is badly needed throughout New England. One local jobbing concern has orders for 85,000 ft. on its books of sizes virtually out of stock. It is extremely difficult to locate 1¼-in. pipe. A large local manufacturer received five cars of pipe the last of January, and a sprinkler company four, but none since then. In both cases they could use ten times that amount. Most consumers have not been as fortunate as these two. Galvanized pipe is especially short

One of the leading mills is operating one out of five of its galvanizing pots. This mill is practically sold a year ahead. The others are sold at least six months ahead and not accepting new business.

Coke.—No Connellsville foundry coke is available on this market to-day. The market on all kinds remains at $11.90 delivered. New England foundries are anticipating covering their last half requirements within a short time.

New York

NEW YORK, Feb. 10.

Pig Iron.—Compared with the two preceding weeks, the past week has been quiet, but compared with earlier weeks there has been considerable activity. The market is very strong, but it was not to be expected that the tremendous buying of the two recent weeks would be continued. Very little iron is obtainable for first half delivery, and transactions are almost entirely for the last half, with the price tendency upward. On eastern Pennsylvania iron the usual quotation is now $44, furnace, for No. 2 plain, and it is doubtful whether any can be obtained at a lower figure. Virginia iron at $42, furnace, is the ruling price, and not much is in the market. The weather of the past week seriously interfered with the movement of pig iron and coke in the metropolitan district and in New England. There is no export business at the present time, but it is expected that there will be if the market continues strong in this country and exchange conditions become more favorable.

We quote for delivery in New York, last half of the year, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$47.05 to $48.05
No. 2 X, sil. 2.25 to 2.75	46.05 to 47.05
No. 2 plain, sil. 1.75 to 2.25	44.80 to 45.80
No. 2 X, Virginia, sil. 2.25 to 2.75	46.40

Ferroalloys.—The ferromanganese market continues very strong but inquiry is not heavy. Sales of small lots for spot delivery are reported at $175, delivered, but very little is available. Practically no alloy, domestic or British, is being offered for first half. American producers are quoting $160, delivered, for the second half, at which a light business is reported. Prices for the British alloy have stiffened and very little is being offered as low as $150, seaboard. Sales of a few lots are noted at this figure, but for two consignments $152 and $155 have been offered respectively, and these prices have been cabled for confirmation. Another British producer is offering a limited amount for shipment from August to December at $155, seaboard. In most cases all offers must be cabled for confirmation, which takes in some cases as many as five days. Production in January, according to the blast furnace reports of THE IRON AGE, was 18,062 gross tons as compared with 11,210 tons in December, showing the effect of blowing in of new furnaces. Imports in December were 3427 tons, bringing the total in 1919 to 33,022 tons or nearly 6000 tons more than in 1918. The spiegeleisen market is strong but fairly quiet at $55 to $57.50, furnace, for early delivery. Production in January was 5895 tons as compared with 4508 tons in December. Two more sales for export of 500 and 750 tons respectively are noted. The manganese ore market is strong. Some Indian and Chilean ore is offered at $1 per unit as compared with sales a short time ago at 80c. Transactions at this high level have not yet been consummated. While the imports of manganese ore in December were relatively large at 36,376 tons, the total for 1919 was small as compared with recent years, having been 333,344 tons, or about 160,000 tons less than in 1918. Ferrosilicon, 50 per cent, is quiet but strong at $80 per ton, delivered.

Finished Iron and Steel.—The heavy snowstorms have further crippled steel plant operations. Shortage of coal and coke and inability to make shipments of steel have all contributed to demoralization of production. It probably will be weeks before the effects of the snow blockade have been overcome. Meanwhile, consumers are pressing for deliveries as well as being anxious to get orders on the books. It is surprising the number of requests for immediate delivery of various steel products, but few, if any, of the mills are accepting premiums for getting out tonnage for early shipment, customers being obliged to take their turn when business is accepted at all. Some of the steel companies report that their customers are anxious to place orders on their books for forward delivery without any consideration as to price. Much of this preferred business is for second half. Plates are hard to get even for second quarter shipment. An Eastern mill refused 3.50c., Pittsburgh, for light plates for export, not being desirous of booking anything below ¼ in. Regular customers are being supplied by some mills at 4c., Pittsburgh, but shipment will be not earlier than second quarter on sheared, although better can be done in some instances on universal plates. The structural steel market is active so far as prospective work is concerned, but comparatively few jobs are being let. The Norfolk & Western Railroad is in the market for a bridge to take about 1000 tons. About 16,000 tons required for two garment factories on Seventh Avenue has been awarded to the McClintic-Marshall Co. For the American Surety Building, New York, 2000 tons has gone to the Levering & Garrigues Co. The Bethlehem Steel Bridge Corporation will fabricate 1300 tons for a dirigible hangar at Cape May, N. J. The American Bridge Co. has taken a cotton mill at New Bedford, Mass., 1500 tons, and the Chicago Bridge & Iron Co. will fabricate 660 tons for three oil tanks for the Hartford Electric Light Co., Hartford, Conn. The Erie Railroad is reported to have placed 1000 freight cars and 48 passenger cars with a leading car builder.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.52c.; shapes, 2.72c. to 2.82c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the higher prices for the first, even the second quarter; bar iron, flats, wider than 6 in., 4.07c.; ⅜ and 7/16 in., round and square, 4.47c.; light rounds, squares and flats, 4.77c., and other sizes, 3.77c.

Warehouse Business.—The entire jobbing trade has been at a standstill since last Thursday or Friday, when many trucks became stalled by the blizzard or were immured at the warehouses. Many streets are impassable for heavy loads and warm weather alone will clear them sufficiently to permit normal deliveries. There has been an advance generally, except for the two leading interests, on iron and steel bars, structurals, plates and sheets. Refined iron bars have been raised in this way from 4.25c. to 4.50c.; bands from 4.75c. to 5.25c.; beams, channels and angles, from 3.90c. to 4.25c.; ties, 1x⅛-in., from 4.75c to 5.25c.; tank plates, ¼-in. and heavier, from 4.25c. to 4.50c.; blue annealed sheets, No. 10 gage, from 5.80c. to 6.25c. On smaller sized angles and tees, and on plates, actual stocks would readily fetch 50c. per 100 lb. more than the scale shown on page 526. For small and thin sizes of spring steel a leading jobber announced an advance from 8c. base to 10c., effective Feb. 9. We quote out-of-store: Steel bars, 3.52c. to 4.25c.; structural shapes, 3.47c. to 4.25c.; plates, 3.67c. to 4.50c.; No. 10 blue annealed sheets, 5.07c. to 6.25c; 28-gage box annealed black, 7c. to 9c.; 28-gage galvanized, 8.25c. to 10c.; shafting and screw stock, rounds, 5.15c. to 6c.; flats, squares and hexagons, 5.25c. to 6.50c.

Cast-Iron Pipe.—It appears that there will be a shortage in pipe before many months because of the large number of orders and the compulsion of turning many of them away. Because of the higher prices, only necessary purchases are being made by municipalities and many private consumers. The snow storms have handicapped production in the case of nearby pipe makers, one plant having been shut down three days because of the inability of employees to get to work. We quote 6-in. and heavier at $70.30, New York; 4-in., $73.30, with $2 additional for class A and gas pipe.

Old Material.—The market in steel is a trifle softer, though this condition is temporary and is because of the embargoes, bad weather, sickness among laborers handling scrap and those helping to consume it. All dealers and brokers are optimistic about the future, pointing to the filled order books of consumers and

their scanty scrap piles. Shipments from this district are about equally divided between eastern Pennsylvania and the Pittsburgh district as to steel. Cast scrap is not being shipped into New England at present because of embargoes. Slight advances have been noted in forge fire, light iron, machine-shop turnings, iron and steel pipe and No. 1 machinery cast. Prices which dealers and brokers are paying per gross ton, New York, are:

Buying prices per gross ton, New York, follow:

Heavy melting steel	$22.00 to $23.00
Rerolling rails	32.00 to 33.00
Relaying rails, nominal	47.00 to 48.00
Steel car axles	33.00 to 34.00
Iron car axles	44.00 to 44.50
No. 1 railroad wrought	33.00 to 34.00
Wrought iron track	25.00 to 25.50
Forge fire	18.00 to 18.50
No. 1 yard wrought, long	26.00 to 26.50
Light iron	10.00 to 11.00
Cast borings (clean)	20.00 to 21.00
Machine-shop turnings	17.50 to 18.00
Mixed borings and turnings	15.50 to 16.00
Iron and steel pipe (1 in. min. diam., not under 2 ft. long	21.50 to 22.00
Stove plate	27.00 to 28.00
Locomotive grate bars	27.00 to 28.00
Malleable cast (railroad)	27.00 to 27.50
Old car wheels	39.00 to 40.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$41.00 to $42.00
No. 1 heavy cast (columns, building materials, etc.) cupola size	38.00 to 39.00
No. 1 heavy cast, not cupola size	29.00 to 30.00
No. 2 cast (radiators, cast boilers, etc.)	29.00 to 30.00

San Francisco

SAN FRANCISCO, Jan. 27.

There is practically no changes in the labor situation here. The strikers of the shipyards last week nade advances to the Metal Trades Association, suggesting the discussion of the situation, and intimating that some compromise might be effected. The association answered with a declaration of its intention to continue to operate under what is termed the American plan, or open shop basis. This ends the prospect for the present of a conference. As has been stated there is little likelihood of the shipyards receding from their stand or of the strike being officially called off. It is probable that present conditions will continue for some time, with the foundries and a few machine shops, mostly small ones, operating on the union basis and the shipyards continuing on the open shop basis.

There is considerable scarcity of several materials among the jobbers. Stocks of steel pipe and nails are very low. A good demand is developing for all materials.

Bars.—The local mills are behind in their orders for bars and users continue to pay a bonus over the regular market for quick delivery. Where no bonus is paid, delivery is delayed from four to six months.

Sheets and Plates.—There is a steady demand for sheets. Out of stock jobbers are quoting on No. 28 gage basis $8.90 in carload and $9.05 in less than carload, A considerable demand for plates is developing. Jobbers quote on tank sheet plate $5.85 and $6 on carload and less than carload lots.

Pig Iron.—Pig iron is not plentiful. A shipment of 500 gross tons of Scotch pig at $56.50, f.o.b. San Francisco, is announced, and it is stated that a further purchase of 600 tons of this pig has just been consummated.

Pipe.—The demand for wrought pipe is far in excess of the supply and the jobbers report their stocks to be growing smaller. The basis price of cast-iron pipe was advanced $3, to $63 per ton basis. There has been considerable movement in cast-iron pipe both among municipalities and for private work. The bulk of the latter has been for the oil companies. Among contracts recently placed are 1500 tons of 4 in. and 6 in. for Los Angeles, which was secured by the United States Cast Iron Pipe & Foundry Co., which also secured 400 tons for the city of Avalon.

Structural Steel.—Plans are out for a 15-story building for the California Insurance Co., this city, which call for about 2200 tons of steel. It is said that over a dozen large buildings will be built here during the present year, calling for 1000 or more tons each. It is planned to erect early next year the Crocker Bank Building, 25 stories, which will require about 6000 tons.

Old Material.—During the past week the local mills bought all the scrap in the yards about the bay at a price of $26.50 per ton net, delivered at the mill. One of the local mills bought some scrap from the Panama Canal, paying for it $28 per net ton, delivered, and there are reports of even higher prices being paid for smaller amounts. These sales clean up the accumulation in the local market.

Philadelphia

PHILADELPHIA, Feb. 10.

It is evident that the precarious foreign exchange situation, with the possibility that it will bring about a considerable curtailment of our export trade, together with pessimistic utterances as to the financial situation by bankers and others in a position of authority, has affected the iron and steel industry sentimentally at least. Some sellers note a falling off in inquiry during the past week, but this may be due in part to the tie-up of transportation resulting from last week's heavy snow storms. The only soft spot in prices is in scrap and that may be only a temporary condition.

The iron and steel trade has not been disposed to regard recent talk of a period of deflation with seriousness, as its own position has seemed secure in view of the enormous tonnages booked and great under-production. A let-up in demand, from whatever cause, would not be unwelcome, and if there should be any real slack later in the year, it is believed that it would be quickly taken up by the needs of the railroads, which are bound to be considerable.

While an undercurrent of uncertainty has extended to the steel trade, the chief concern at present is to increase or rather maintain production. The car shortage, which is aggravated by the heavy snows of last week, is working havoc. Nearly every Eastern steel plant is affected by coal shortage and some have been obliged to reduce open-hearth operations. The Bethlehem Steel Co. has three or four furnaces banked and the Eastern Steel Co. has banked the only stack it had in blast. Other furnaces have slowed down. Many of the furnace companies are out of the market for first half, and such iron as is available is at least $1 higher than a week ago.

Among higher prices being quoted for steel products are formal advances on railroad spikes, track bolts, some sizes of machine and carriage bolts, cold punched nuts, etc.

Pig Iron.—Eastern Pennsylvania furnaces are generally out of the market for first half, but foundry iron is available for second half at about $43, base, f.o.b. furnace, the base price applying to iron containing 1.75 to 2.25 per cent silicon. For prompt delivery slightly higher prices are asked, ranging from $44 to $45, furnace, for No. 2 X (2.25 to 2.75 per cent silicon). Furnaces are running behind on shipments on account of car shortage. There has been a slowing down of furnace operation because of coke shortage and some furnaces have been obliged to bank. The demand for foundry iron is considerably less active. Nothing new has developed in basic. Small lots of standard low phosphorus iron have been sold at $50, furnace, and $52 is now quoted. Copper bearing iron is quiet and is nominally quoted at $45, furnace, although little, if any, is available for first half.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Pa., No. 2X, 2.25 to 2.75 sil.	$45.35 to $46.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	44.10 to 45.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	46.10
Virginia No. 2X, 2.25 to 2.75 sil.	47.35
Basic deliv. Eastern Pa.	41.40
Gray forge	40.50 to 41.50
Standard low phos. (f.o.b. furnace)	50.00
Malleable	45.15
Copper bearing low phos. (f.o.b. furnace)	45.00

Ferroalloys.—Carload lots of 76 to 80 per cent ferromanganese for prompt delivery have been sold at $175 to $180, delivered. Not much is available short of second half delivery, for which the quotation is $160, delivered. Foreign alloy is not openly on the market, but selling agents will submit to their principals abroad offers of $150, seaboard, for second half delivery. Not much is being done here in spiegeleisen, but quotations are heard of $57.50 to $60, furnace, depending on the delivery.

Semi-Finished Steel.—Mills need all of their semi-finished steel for their own finishing mills; so very little, if any, business is being done. Ideas as to price vary, but last reported sales of open-hearth rerolling billets were at $55, Pittsburgh. Some sellers say $60 could easily be had. A Chicago broker offers about 8000 tons of sheet bars at $78, f.o.b. cars, Chicago.

Plates.—One large Eastern plate mill reports that it is literally submerged by inquiries for plates. Consumers are even making personal calls to implore the mills to accept their business. A good deal of current inquiry comes from railroads or from locomotive and car builders who are figuring on railroad work, principally urgent repairs. One mill goes so far as to make buyers show exact specifications in detail before it even submits a quotation. Operations of plate mills have been seriously curtailed as a result of the heavy snowstorms last week, some of them having been on the verge of shutting down owing to shortage of gas coal. It is difficult to quote the plate market, as so few mills are selling. Orders have been taken at 4c., Pittsburgh, or higher, but at the same time some mills have sold small lots to regular customers at lower prices. One Eastern mill quotes 3.50c., Pittsburgh, but has nothing for the open market and very little even for its own trade.

Structural Material.—Shapes have become very scarce, as practically all, if not all, of the Eastern mills decline to sell. One mill with an affiliated fabricating interest would like to place several thousand tons outside. An Eastern shipbuilder who came into the market last week for 5600 tons of plates and a lesser tonnage of shapes, was able to get a quotation of 4c., Pittsburgh, for plates but could not find a mill willing to take the shapes at any price. As high as 4c., Pittsburgh, is now quoted on shapes, and it is doubtful whether much better could be done.

Rails and Track Supplies.—An inquiry is in the market for 5000 tons of 45 to 65-lb. rails for shipment to the Philippine Islands. The price of steel railroad spikes has been advanced by some Eastern makers to 4c., Pittsburgh, for ½ in. and larger and to 5c., Pittsburgh, for 7/16 and ⅜ in. and smaller. Steel track bolts have also been advanced to 6c., base, Pittsburgh.

Bolts, Nuts and Rivets.—Eastern makers of bolts, nuts and rivets and one or two Central Western manufacturers have advanced prices on some items, the new discounts being as follows:

Square head machine bolts with square hot-pressed nuts, small, rolled thread, 40, 10 and 5 per cent off list; small, cut thread, 40 and 5 per cent off; larger and longer, 30 and 10 per cent off; carriage bolts, small, rolled thread, 40 and 5 per cent off; small, cut thread, 30 and 10 per cent off; larger and longer, 30 per cent off; lag screws, 50 per cent off; square head machine bolts, cold punched c. and t. nuts, small, 35 per cent off; large, 25 per cent off. Cold punched nuts, blank, are now 2.25c. off list and tapped are 2c. off; there is no change in hot pressed nuts; semi-finished nuts are advanced, the new discounts being 60 and 5 per cent off on 9/16 in. and smaller and on ⅝ in. and larger; full finished nuts, case hardened, are now quoted at 60 and 5 per cent off list.

A change has been made in the extras on rivets whereby the extra for 100-lb. kegs is now 25c. instead of 10c. A Philadelphia manufacturer is in the market for 1,000,000 bolts and nuts for shipment at the rate of 250,000 a month, beginning in March.

Bars.—A mill has sold 1000 tons of soft steel bars to a jobber for indefinite delivery at 4c., Pittsburgh. Steel bars are practically unobtainable from mill for early delivery and considerable business is still being diverted to bar iron even at the $10 a ton advance on the latter, which went into effect a week ago. There have been sales of spring steel in lots of a few hundred tons at 4.25c. and 4.50c., Pittsburgh. About 2000 tons of reinforcing bars for three concrete bridges will soon be required. Bids closed this week on a bridge at Harrisburg for the Philadelphia & Reading Railroad. Another bridge at Bethlehem, Pa., is up for bids, which close Feb. 27, and a concrete bridge will also be built at Wilmington, Del.

Cold-Finished Steel Bars.—Two of the leading makers in the Pittsburgh district still adhere to 3.60c., base, for cold-finished steel bars and shafting, and another quotes 3.90c., but all three are reported to have nothing to offer for reasonably early delivery. A smaller maker has been selling at 4.50c., Pittsburgh, with delivery in about three months.

Old Material.—Prices of iron and steel scrap, which have been rapidly mounting for several weeks, became slightly softer last week through a combination of circumstances. A contributing factor was the completion of buying by brokers on contracts for delivery of heavy melting steel in the Pittsburgh district. Another factor was the curtailment of steel and pig iron production in the East due to coal and coke shortage, this making it appear uncertain as to how soon consumers might again be in need of scrap other than the ordinary flow of small lots. Added to these factors was the uncertainty resulting from pessimistic utterances concerning the financial situation, the position of foreign exchange and predictions of a period of deflation. Some yard dealers got slightly panicky and were willing to sell at slight concessions, but the change in prices is by no means important and affects only a few grades. Some grades, in fact, are higher this week than last, notably No. 1 railroad wrought. Heavy melting steel and No. 1 cast are slightly lower. In past years the tendency of scrap to move more freely in the spring has nearly always resulted in a lowering of prices at that season. Some dealers doubt that history will repeat itself this year in that respect unless the steel mills can soon increase their rate of production.

We quote for delivery at eastern Pennsylvania consuming points as follows:

No. 1 heavy melting steel	$26.00 to $26.50
Steel rails rerolling	36.00 to 37.00
No. 1 low phos., heavy, 0.04 and under	32.00 to 33.00
Car wheels	40.00 to 45.00
No. 1 railroad wrought	36.00 to 37.00
No. 1 yard wrought	30.00 to 31.00
No. 1 forge fire	21.00 to 22.00
Bundled skeleton	21.00 to 22.00
No. 1 busheling	24.00 to 25.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	19.00 to 20.00
Mixed borings and turnings for blast furnace use)	18.00 to 18.50
Machine-shop turnings (for rolling mill and steel works use)	21.00 to 22.00
Heavy axle turnings (or equivalent)	22.00 to 23.00
Cast borings (for rolling mills)	23.50 to 24.50
Cast borings (for chemical plant)	25.00 to 26.00
No. 1 cast	40.00 to 41.00
Railroad grate bars	31.00 to 32.00
Stove plate	31.00 to 32.00
Railroad malleable	30.00 to 31.00
Wrought iron and soft steel pipes and tubes (new specifications)	25.00 to 26.00
Iron car axles	45.00 to 46.00
Steel car axles (f.a.s. New York for export)	39.00 to 40.00

Cleveland

CLEVELAND, Feb. 10.

Iron Ore.—A very heavy tonnage of ore was sold during the week, following the establishment of new prices at the $1 per ton advance over 1919 prices and most of the larger consumers have covered for their full requirements for the year. Owing to the heavy demand for foundry and basic pig iron, the bulk of the demand has been for ores for making these grades of iron and little Bessemer ore has so far been booked. Some of the mining companies have sold nearly all their expected production for the season. Eastern buyers have come into the market freely and one large Eastern consumer has purchased 500,000 tons from one ore firm and several other round lots, making a total of at least 1,000,000 tons and probably close to 1,500,000 tons. Consumers are buying about the same amount of ore that they did during 1918, when shipments reached 61,156,732 tons. It is estimated that the shipments

the coming season will amount to 55,000,000 to 60,000,000 tons. On Feb. 1 there was 9,661,466 tons of ore on Lake Erie docks as compared with 8,633,936 tons a year ago. Shipments from the docks to the furnaces last month were only 430,104 tons as compared with 735,094 tons during January last year. Shipments have been light the greater part of the winter but shipping orders have improved recently. However, owing to the car shortage, some shippers are able to get only 50 per cent of the cars needed.

We quote, delivered, lower Lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—Sales were fairly heavy during the week, but inquiry has fallen off somewhat following the heavy buying of foundry and malleable iron for the last half delivery. One producer sold 50,000 tons during the week, but several others are so well filled up that they are taking only limited tonnage. Basic iron is very active and little is available for the first half. One western Pennsylvania melter has taken 17,000 tons of basic for the last half, 7000 tons from a Cleveland furnace on the basis of $40 Valley, and the remainder from a nearby producer who took advantage of the greater part of the $1.40 freight differential, making the price to the seller approximately $41. For delivery during the first half, quotations on basic iron have been advanced to from $42 to $43 and the sale of 2000 tons is reported at the latter prices. The American Steel Foundries is inquiring for 10,000 to 15,000 tons of basic iron for the last half for its Alliance and Sharon plants, but it is expected to purchase considerable in excess of that amount. Foundry iron prices are firmer. While a Cleveland furnace has not withdrawn its $40 price for 1.75 to 2.25 per cent silicon iron for the last half, one Lake furnace has advanced its price to $41 for that delivery and sales in small lots have been made at $42. For earlier delivery a small lot of foundry iron has been bought at $43 for the second quarter. Some southern Ohio foundries are asking $43 for the last half. We note the sale of 200 tons of malleable iron at $42 for early shipment. Two Jackson County producers have withdrawn from the market on silvery iron, being about sold up for the year and another has advanced prices $2.50 per ton on both silvery and Bessemer ferrosilicon. This producer is now quoting eight per cent silvery at $55 and Bessemer ferrosilicon at $64.50 for 10 per cent, $67.50 for 11 per cent, $71.10 for 12 per cent. We note the sale of 500 tons of ferromanganese at $160 for the last half.

We quote delivered Cleveland as follows:

Basic	$40.40 to $43.40
Northern No. 2 foundry, sil. 1.75 to 2.25	40.50 to 43.40
Southern foundry, sil. 2.25 to 2.75	46.25 to 46.60
Gray forge	39.40
Ohio silvery, sil. 8 per cent	58.40
Standard low phos., Valley furnace	45.00 to 46.00

Finished Iron and Steel.—A great deal of inquiry for finished iron and steel is still coming out for early shipment and mills able to make reasonable delivery continue to advance prices. The securing of steel rather than the price is the main concern of many consumers. Plates for early shipment have been advanced to 4c. by a Cleveland and also by a Pittsburgh district mill, and a considerable tonnage is being booked at that price. A western Pennsylvania mill has advanced its price on structural material to 4c. and a 600-ton lot went at that price to a fabricator. It is felt that this price is prohibitive for construction work requiring a round tonnage of steel. Considerable structural work is being figured on and the American Bridge Co. has taken 2600 tons for the new sheet mill plant of the Otis Steel Co. and the Massillon Bridge & Structural Co. 800 tons for the Cleveland plant of the Fisher Ohio Body Co., which will also require 3000 tons for re-inforcing bars. Inquiries include 400 tons for the LaSalle Steel Co. Considerable inquiry is also coming out for railroad bridge work. Steel bars are almost off the market for early shipment and jobbers' prices are not uniform, depending on the prices they have to pay the mills. One mill is offering angles in bar sizes at 4c. We note the sales of several hundred tons of cold-rolled steel bars at 4.50c., Pittsburgh. A Cleveland mill has advanced sheet prices to 6c. for blue annealed and 6.50c. for black. Quotations on galvanized sheets range from 8.50c. to 9c. for early shipment. Two Cleveland jobbers have advanced nail prices to 4c.

Coke.—The coke situation shows no improvement and many foundries are being compelled to shut down a day or two at a time for lack of fuel, due to the car shortage. Many consumers are trying to place orders to piece out their requirements, but producers are not selling for any delivery.

Bolts and Nuts.—The demand for bolts and nuts is heavy and prices are very firm. Some manufacturers have advanced price 10 per cent on bolts and to list on hot and cold-pressed nuts in 1½ in. and larger sizes. Production of small bolts has been curtailed because manufacturers are unable to secure wire. Some consumers are trying to buy for the third quarter or the last half, but manufacturers are unwilling to sell that far ahead. The minimum prices quoted by Cleveland manufacturers on ¾ x 4 in. machine bolts is 50 and 7½ per cent off list, for smaller and shorter rolled threads, 40, 10 and 5 per cent for cut threads, and 40 per cent for larger and longer sizes, and on plow bolts 40 and 10 per cent off list, for Nos. 1, 2 and 3, and 20 per cent extra for Nos. 4 to 10. Other prices conform to our prices under finished iron and steel, page 510.

Old Material.—The weakness that developed in the local scrap market several days ago is still evident. This, undoubtedly, is due to a considerable extent to an embargo against shipments to the McKinney Steel Co., the largest local consumer. Restrictions of shipments to other Cleveland mills have been lifted. Following the recent heavy buying by the mills there is little activity, trading being confined mostly to dealers.

Cast scrap is still very firm and has sold as high as $39 net for a small lot. The sale of 500 tons ship plate shearings is reported at $29 at producers' yard in Lorain.

We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$26.75 to $27.00
Steel rails, under 3 ft	32.00 to 33.00
Steel rails, rerolling	34.00 to 35.00
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap	30.00 to 31.00
Cast borings	18.50 to 19.00
Iron and steel turnings and drillings	18.00 to 18.50
Short turnings for blast furnaces	18.50 to 19.00
Compressed steel	24.00 to 25.00
Railroad wrought	29.00 to 30.00
Railroad malleable	32.00 to 32.50
Agricultural malleable	27.00 to 28.00
Steel axle turnings	24.00 to 25.00
Light bundled sheet scrap	18.50 to 19.00
No. 1 cast	40.00 to 41.00
No. 1 busheling	22.50 to 23.00
Drop forge flashings, over 10 in.	22.00 to 22.25
Railroad grate bars	30.00 to 31.00
Stove plate	30.00 to 31.00

New Wire Company Stack

The American Steel & Wire Co. has asked for an appropriation for the building of a new blast furnace at Donora, Pa., to be located beside the present two furnaces there, and to furnish metal for the open-hearth plant at Donora. This will be a 500-ton stack, and its cost, together with ore bridge, ore bins and other necessary equipment, will exceed $6,000,000. It is expected that work on this new stack will be started in the near future.

Takes Over Tank Car Company

The plant and assets of the Allegheny Steel Tank Car Co., Warren, Pa., builder of tank cars, have been taken over by the Allegheny Tank Car Co. The new corporation will, in addition to the manufacture of tank cars, considerably increase its repair department and will maintain a tank car line for the purpose of leasing cars to such companies as may require this service.

British Supplies Inadequate

Pig Iron High and Scarce—Welsh Tin Plate Output—Galvanized Sheets Soaring

(By Cable)

LONDON, ENGLAND, Feb. 9.

Pig-iron makers are urging the restriction of exports of coke because supplies are insufficient for home furnaces. The export demand for pig iron is very heavy and export prices are almost anything, the premium officially fixed for the Allies being purely nominal and up to £12 10s having been paid for Cleveland foundry, f.o.b. works. There is not nearly enough iron to go around and the output is kept down by the chaos in railroad traffic. Buyers are finding great difficulty in obtaining anything before the end of March, and makers are declining to consider second quarter delivery owing to the uncertain outlook. Production is practically reserved for home needs. Hematite iron is equally stringent, up to 250s being asked for export.

Iron ore prices are soaring, 64s c.i.f., Tees, being asked for the best Rubio.

The tin-plate market is stronger on a fresh advance of £5 to £30 for Welsh tin plate bars, which has been paid for summer delivery. Demand for tin plates is good. The Welsh output last year was 12,386,326 boxes, against 8,808,272 boxes in 1918. Responsible people here believe that the American domestic demand this year will prevent any formidable competition with Wales. Japan, however, is reselling Welsh tin plate and replacing American. Dealers are still offering American tin plate here, but the price is not attractive. Argentina is offering odd sizes of resale tin plate for quick shipment.

The galvanized sheet market is rampant and it is impossible to fill more than a fraction of the demand. Prices are no bar and big Eastern demands are unfilled, especially for Rangoon, Japan, Bangkok specifications. As high as £51 works has been freely paid for No. 24 gage, but makers are unwilling to close anything but for small lines.

The coal production for the week ended Jan. 24 was 4,851,000 tons, as compared with 4,902,000 tons for the week ended Jan. 17.

We quote per gross ton, except when otherwise stated, f.o.b. makers' works, with American equivalents figured at $3.38 for £1, as follows:

	£	s.	d.	£	s.	d.	
Ship plates	22	10	0 to	25	10	0	$76.05 to $86.19
Boiler plates	26	10	0 to	29	0	0	89.57 to 98.02
Tees	20	10	0 to	23	0	0	69.29 to 77.74
Channels	19	15	0 to	22	15	0	66.75 to 76.89
Beams	19	10	0 to	22	10	0	65.91 to 76.05
Round bars, ¾ to 3 in.	22	0	0 to	24	10	0	74.36 to 82.81
Rails, 60 lb. and up	18	15	0 to	19	5	0	63.37 to 65.06
Billets	23	0					77.74
Steel hoops	28	15	0 to	29	0	0	97.17 to 98.02
Tin plates	0	70	0 to	0	72	0	11.83 to 12.16
Sheet and tin plate bars, Welsh	23	0	0 to	30	0	0	77.74 to 101.40
Galv. sheets, 24 g.	49	0	0 to	51	0	0	165.62 to 172.38

Sharp Advances in Pig Iron and Steel — Several Important Consolidations

LONDON, ENGLAND, Jan. 19.—Prices of pig iron have been advanced, and the new home trade figures are 182s. 6d. for No. 1, and 175s. for No. 3 Cleveland g.m.b. with an additional 5s. for export. A new feature, however, in regard to the extra 5s. is that this only applies for shipments to France, Italy and Belgium, other foreign markets being free. As a consequence very soon after the fixing of the prices, 200s. became the established minimum for other oversea markets than the three countries named, and before long 210s. had actually been paid. The advance has not had any subduing influence on buyers who seem as keen as ever. Makers, being fully booked and having great difficulty in increasing production, have had to go cautiously and are endeavoring to conserve enough iron to keep the home trade going. A good demand has been in evidence from Scotland, but the car shortage hampers delivery. Hematite is not quite so scarce as Cleveland iron but in this case also makers are pursuing a conservative policy and offering with reserve. The new prices are 220s. for the home trade and 225s. for export to France, Italy and Belgium.

As regards steel the rise in pig iron as well as in railroad rates obviously necessitated higher prices for steel also, and these have been put up in all directions. The advance is generally spoken of as being 25s., but this appears to apply only to Northeast Coast makers, as in other directions much higher figures seem to have been decided upon. For example in Scotland some makers have put up their figures as much as £3. In any case it appears that the 25s. advance practically only applies to those buyers who had already placed contracts which were still undelivered, the prices for which will be advanced to that extent in cases where orders were booked subject to fluctuations. For new orders the increase will be still more. The general result is that there is a good deal of variation in quotations mentioned and it is difficult to quote prices with any precision. The inquiry both for home and export is good. There had been a slight lull since Christmas owing to holidays and stock taking.

It is reported that an important amalgamation of Clyde shipbuilding companies is taking place. It appears that the Clyde Shipbuilding & Engineering Co. and Murdock & Murray, shipbuilders, both of Port Glasgow, have been taken over by the Amalgamated Industrials, Ltd., of London. Another item of interest is the announcement by the directors of Guest, Keen and Nettlefolds, Ltd., and John Lysaght, Ltd., that arrangements have been made whereby the former acquires the controlling interest in the latter, and that an offer to purchase on similar terms will be made to the other ordinary shareholders of the latter company. The Guest company is already a very large engineering and steel manufacturing firm. The company was formed in 1900 to acquire the business of the Dowlais Iron Co., Messrs. Guest & Co. and the Patent Nut and Bolt Co., while two years later the business of Nettlefolds, Ltd., was acquired. A company was consequently formed of ironmasters, colliery proprietors and manufacturers of steel and iron railroad materials, nuts, bolts and wire work in Birmingham and South Wales. Some time ago the business of F. W. Cotterill, Ltd., of Darlaston, was also taken over. The acquisition of John Lysaght, Ltd., will greatly extend its scope in every direction. Some months ago the purchase of John Lysaght, Ltd., was effected by H. Seymour Berry and D. R. Llewellyn, representing a strong financial group. The Lysaght firm was founded in 1857. It not only manufactures galvanized and black sheet iron but iron parts of all kinds for structural purposes, wire netting, hollow ware, agricultural goods, etc. Latterly it has started on the making of steel and has leased iron ore-bearing lands.

It is now reported that Messrs. Harper Bean, Ltd., the £6,000,000 motor trade combine which was recently formed, has purchased the National Projectile Factory at Dudley. The price is not mentioned but a large quantity of the machinery has also been bought. The plant with its equipment cost £890,000 and occupies an area of 39,000 sq. ft. It is reported that Messrs. Sperling & Co., of London, have purchased the Chepstow National Shipyard with the intention of carrying out an extended shipbuilding program in connection with similar activities in other centers.

Export Notes

The South Manchurian Railroad, recently in the market for about 60 miles of 100-lb. rail, is inquiring for 50 miles of rail.

Several inquiries are in the market from China for plates, shapes and other shipbuilding material.

An exporter dealing with French and Belgian markets recently shipped two orders of 500 and 750 tons of spiegeleisen to Antwerp on the order of a London dealer. Inquiries and orders from the European market

have dwindled to a few small purchases of immediate necessities since the exchange rate recently reached a new low mark.

An export firm recently sold to Japan about 1000 tons of bars, 1600 tons of structural steel, 1200 tons of 60-lb. rail and 500 tons of miscellaneous material. Rail inquiries and orders from Japan are good and a large number of inquiries are in the market for sheets and plates. One house has shipped about 300 tons of ship plates to Japan within the past week.

About 1000 tons of spiegeleisen have been sold to Holland by a well known exporter and about 500 tons to Belgium. Recent sales of spiegeleisen to the export trade have been at about a $7 increase. A buyer in England has purchased 6000 boxes of tin plate.

Swedish shipbuilders are in the market for plates and other shipbuilding material.

Will Build Another Weirton Stack

PITTSBURGH, Feb. 10.—The Weirton Steel Co., Weirton, W. Va., which built and put in operation last summer a 600-ton blast furnace, has decided to build another stack of the same size adjacent to the present furnace, but active work on the new furnace may not start this year, owing to high cost of labor and materials and for other reasons. When the new stack is built and in operation, the Weirton Steel Co. proposes to build two batteries of 60 ovens each for making by-product coke and by-products.

It is figured that these 120 ovens will make enough by-product coke to supply the two blast furnaces. At present the Weirton Steel Co. is using bee-hive coke in its blast furnace at Weirton, which the company is making at No. 1 Thompson-Connellsville coke plant in the Connellsville region, which it bought about a month ago from the Hillman Coal & Coke Co., Pittsburgh.

Industrial Census

WASHINGTON, Feb. 10.—The census of the nation's industries, including manufacturing plants, mines, quarries, oil and gas wells, will start March 1. The country has been divided into 589 districts for the purpose of this census, and 1200 men will be needed to make the count. There are now about 400,000 manufacturing plants listed by the census bureau. Enumeration in the various states will be in charge of a force of 98 special agents from the Washington office of the Census Bureau. In the future the industrial census will be taken every two years instead of only at the time of the decennial census.

Minnesota Steel Co.'s Record

The open-hearth department of the Minnesota Steel Co., Duluth, has made a remarkable record for production during the past year. It was erected with a theoretical capacity of 365,000 tons of steel per year, but has turned out in 12 months fully 592,000 tons—a truly remarkable accomplishment.

The Minnesota Steel Co. is to begin building immediately a coal receiving dock at a cost of $1,000,000. It has been using the coal dock of the Duluth, Missabe & Northern Railroad. It is also to complete its belt line railroad around the head of the lake, connecting its plant with every trunk line that enters that section.

New Milwaukee Mill

MILWAUKEE, WIS., Feb. 10.—The Milwaukee Rolling Mill Co. has engaged the Northwestern Bridge & Iron Co., this city, as designing and construction engineer for a new mill. The structural mill requirement will be 1500 tons. The Mesta Machine Co., Pittsburgh, will furnish a 16-mill plant. The Milwaukee Electric Crane & Mfg. Co. will furnish two 40-ton cranes with 10-ton auxiliary hoists and three 10-ton cranes. It is reported that the General Steel Co., Milwaukee, will provide the sheet bar supply, putting into operation the 24-in. blooming mill, idle since Oct. 1.

YOUNGSTOWN POLICY

Annual Meeting of the Sheet & Tube Company—Decreased Earnings

YOUNGSTOWN, OHIO, Feb. 10.—The steel strike cost the Youngstown Sheet & Tube Co. $2,352,202, stockholders were informed to-day at the annual meeting by President James A. Campbell, who reported gross earnings of $55,354,363 in 1919 as compared with $84,600,000 in 1918. Shipment of 705,254 tons showed a big falling off from the year before.

The company added $2,914,993 to surplus, giving it a surplus of $46,614,000. Total assets are $94,685,000. The 1919 payroll was $20,084,420.

"We have advanced our selling prices in line with advancing costs, and expect to follow this policy in the future," stated Mr. Campbell, "but the problem ahead of us is not an easy one, for the reason that there is a wide fluctuation in prices and the tendency on the part of the opportunist is to get all that the trade will stand. We fear this policy, if pursued to a great extent, will soon land us on a plane so high that the demand for material will cease on account of excess prices asked. Our policy will be to keep our business on an even keel, asking a reasonable profit on our output, and while we realize that temporarily this will not be as profitable for us as a different course might be, we believe that it will be best for your company, for the industry, and the country as a whole. At the same time, if we can secure ample transportation, which is not likely, there is every reason to believe that the coming year will be a busy one and fairly prosperous.

"Whether this country can finance itself, and the world as well, remains to be seen. I am sure that it can only be done by additional production in all lines and by economy on the part of the people. In other words, the only hope of doing so is out of the savings of the people as a whole. I have great faith in the American bankers and believe that they will protect the financial situation in this country by loaning only our surplus abroad. With the present high rate of wages in all lines of endeavor, the present high prices of all commodities, a Presidential election to be held this year and all the uncertainties that usually go with it, this is certainly a time for the American people to keep their heads and their houses in order."

The company's inventory is $27,426,509; plant account is $45,119,624; reserves and depreciation $13,109,102. At its coal mines in Pennsylvania, the company is mining 1000 tons a day. Sales of the Continental Supply Co., subsidiary, were $25,000,000 last year.

George D. Cameron, Cleveland, was elected to the board, replacing Amasa Stone Mather, deceased, and A. E. Adams, Youngstown, was chosen in place of Hugh B. Wick, Elyria.

Government Needs Draftsmen

The United States Civil Service Commission announces that the Government is in need of a large number of draftsmen of various kinds. It is stated that fully 1000 draftsmen were appointed in the Government service during the last calendar year. During this period of reconstruction technical men are especially needed. Besides draftsmen there are openings for surveyors and computers, also assistant and associate engineers, electrical, mechanical, civil, chemical and ceramic. Further information and application blanks may be obtained from the U. S. Civil Service Commission, Washington.

Belgium Buys Cars in England

BRUSSELS, BELGIUM, Jan. 23.—Belgian railroads have placed orders in England for 13,400 freight cars of various capacities. The shortage of all kinds of metal products is becoming serious, few buyers being able to obtain quotations from the producers. The 8-hr. day is strongly opposed by employers, who prophesy an expensive experience and greatly reduced stocks.

IRON AND INDUSTRIAL STOCKS

Drastic Inroads Have Been Made Recently on Market Valuations

NEW YORK, Feb. 9.

Drastic inroads have been made recently on market valuations of the important iron and industrial stocks. For instance, United States Steel has sold 11¼ points below its high price for January, Bethlehem B, 14½; Crucible, 29½; Republic Iron & Steel, 21¾; American Locomotive, 15⅝; Baldwin, 18; General Motors, 87; Pierce-Arrow, 27½; Studebaker, 26⅞, and so on down through the list. As a group, the copper stocks have suffered less than any other, the average losses, as against the high for January, running about nine points. The action of the latter undoubtedly has been due to the continued heavy sales of copper metal, 250,000,000 lb. having been disposed of in January, bringing the combined sales for November, December and January up to about 750,000,000 lb.

In some quarters the decline in the motor shares has been largely based, it is believed, on the inability of the manufacturers to secure raw materials and freight cars to ship their finished product. The weakness of General Electric is believed to be due in part to the fact that the corporation is to issue a large amount of new securities. Other reasons are ascribed for the action of various other classes of stocks.

But the general course of the market appears to be based primarily on the recent action of foreign exchange rates. For a long period new low rates of exchange on England, France, Italy and other European countries as well as Canada, have been established. With each succeeding new low record has grown the fear that our export business must be virtually eliminated. In financial circles it has been figured that with exports prohibited by exchange rates, raw products and manufactured goods finding no outlet, will have to move toward lower level values as the domestic consumption and production grow more nearly equal.

With the falling exchange rates has come a domestic money tension, which has resulted in excessive loaning rates, which have made it extremely unprofitable to hold securities on margin, and have brought about active liquidation from certain quarters.

Basic industrial conditions have not changed, however. There remains a serious shortage of steel and steel products, and prices for them are advancing instead of declining with stock market valuations. Coal is no cheaper, and there is a decidedly more hopeful feeling regarding the outlook for the enactment of legislation favorable to the railroads. Because of basic industrial conditions, there has been excellent buying of securities on the down grade, which indicates that strong financial interests have faith in the future.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com..	41½- 46	Int. Har. com.....	116½-122⅝
Am. Can com.....	45½- 51	Int. Har. pf.....	— -113⅛
Am. Can pf.....	95 - 97⅞	Lackaw. Steel.....	73 - 81¼
Am. Cr. & F. cm.	126½-134⅞	Lake Sup. Corp...	17¼- 20
Am. Cr. & F. pf..	114¾-116½	Midvale Steel.....	45 - 47¾
Am. Loco. com...	88½- 94½	Nat.-Acme	36¼- 37¾
Am. Loco. pf.....	— -106	Nat. E. & St. cm.	70 - 78¼
Am. Ship com.....	104 -110	N. Y. Air Brake..	98 -105
Am. Stl. Fdr. cm.	39¾- 43½	Nova Scotia Stl...	53 - 66
Am. Stl. Fdr. pf..	92 - 92¾	Pressed Stl. com..	89½- 96
Bald. Loco. com..	106⅛-112⅞	Ry. Stl. Spg. com.	90¼- 95¼
Bald. Loco. pf....	99⅝-100	Ry. Stl. Spg. pf...	103¾-104
Beth. Stl. com....	85 - 88	Replogle Steel.....	40 - 41
Beth. Stl. Cl. B...	87¾- 92⅞	Republic com.....	102⅛-108
Beth. Steel, 8 per cent. pf.....	110½-113½	Republic, pf.....	101 -103⅝
Case, J. I., pf.....	97¾- 98	Sloss com.....	68½- 73
Central Fdry. pf..	— - 45	Sloss pf.....	— - 90
Chic. Pneu. Tool..	85 - 90	Superior Steel.....	44½- 46⅞
Colo. Fuel.....	37½- 39	Transue-Williams.	54½- 60
Cruc. Steel com...	204 -216	U. S. Alloy Steel..	43 - 48
Cruc. Steel pf.....	98 - 99½	U. S. Pipe com...	16 - 19¼
Deere & Co. pf....	— -101	U. S. Pipe pf.....	44 - 45
Gen. Electric.....	153 -164	U. S. Steel com...	96⅞-102¾
Gt. No. Ore. Cert.	35⅛- 37¼	U. S. Steel pf....	110¼-113
Gulf States Steel.	62⅛- 71½	Vanadium Steel...	45 - 50
Gulf St. Stl. 1st pf.	— - 92¼	Va. I. C. & Coke.	— - 83
		Westingh. Elec...	49⅛- 52⅝

American Steel Foundries Report

The 1919 report of the American Steel Foundries shows a surplus after all charges and Federal taxes of $4,210,634, which, after allowing for 3½ per cent preferred dividends for the six months, is equal to $7.55 a share on the corporation's $17,184,000 common stock, as contrasted with $15.68 earned on the common stock in 1918.

The corporation during past years has devoted its attention almost exclusively to the production of railroad equipment, which caused sharp fluctuations in profits year to year. To stabilize its business, the company in 1919 took over the Griffin Wheel Co. Another new venture for Steel Foundries is the manufacture of automobile disk wheels.

A special meeting of the stockholders has been called for March 18, the same day as the annual meeting, for the purpose of authorizing an increase in the common stock from 515,520 to 750,000 shares.

Midvale Steel Co. Earnings

The report of the Midvale Steel Co. for the quarter ending Dec. 31, last, shows net earnings for that period, after providing for all taxes, of $5,654,086, as compared with $8,456,670 for the corresponding period in 1918, a decrease of $2,802,684. The company's interest charges amounted to $779,182, as against $869,824 for the quarter ended Dec. 31, 1918, the saving thereby being $90,642.

For depreciation, etc., the company wrote off $1,592,309, as against $2,562,849 for the corresponding period during the previous year, a decrease of $970,540. The net profits for the last quarter of 1919, therefore, amounted to $3,282,595, as contrasted with $5,023,997 for the three months ending Dec. 31, 1918, a decrease of $1,741,402.

General Motors Earnings

The income account of the General Motors Corporation for the nine months ending Sept. 30 last, shows net profits, after Federal taxes, of $15,314,476, as compared with $13,579,019 for the quarter ending June 30, 1919, and $17,615,145 for the previous three months. This showing in the face of a shortage of coal and the curtailment of steel production is encouraging.

The company has set aside large amounts for carrying into effect the program of increased production in 1920. Approximately $7,500,000 will be spent for new factory buildings and extensions to the Buick plant, Flint, Mich., production at which is expected to reach 750 cars daily by spring.

Dividends

The Bethlehem Steel Co., quarterly, 1½ per cent on the common A and B, 2 per cent on the 8 per cent preferred and 1¾ per cent on the 7 per cent preferred, all payable April 1.

The Colorado Fuel & Iron Co., quarterly, ¾ per cent on the common and 2 per cent on the preferred, payable Feb. 20.

The Eastern Steel Co., quarterly, 2½ per cent on the common in Liberty Loan bonds, payable April 15, and 1¾ per cent on the first and second preferred, payable March 15.

The Inland Steel Co., quarterly, 2 per cent, payable March 2.

The International Harvester Co., quarterly, 1¾ per cent on the preferred, payable March 1.

The Lima Locomotive Works, 1¾ per cent on the preferred, payable Feb. 11.

The Pressed Steel Car Co., quarterly, 2 per cent on the common, payable March 10, and 1¾ per cent on the preferred, payable March 2.

The Savage Arms Corporation, quarterly, 1½ per cent on the common, payable March 15, extra 5 per cent on the common, payable April 30; 1¾ per cent on the first preferred and 1½ per cent on the second preferred, payable March 15.

The Standard Sanitary Mfg. Co., quarterly, 2 per cent and extra 2 per cent on the common, and 1¾ per cent on the preferred, all payable Feb. 10.

The United States Steel Corporation, quarterly, 1¼ per cent on the common, payable March 28, and 1¾ per cent on the preferred, payable Feb. 28.

The Dominion Steel Corporation, quarterly, 1½ per cent on the preferred, payable Feb. 1.

The Taylor-Wharton Iron & Steel Co., quarterly, 1¾ per cent on the preferred, payable Feb. 2.

The Chicago Pneumatic Tool Co., quarterly, 2 per cent, payable Jan. 26.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
Feb.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
4	19.50	19.25	56.75	8.75	8.45	9.20	8.85
5	19.25	19.12½	57.00	8.75	8.45	9.00	8.65
6	19.25	19.12½	57.76	8.75	8.45	8.95	8.60
7	19.25	19.00	....	8.75	8.50	8.90	8.55
9	19.25	19.00	58.00	8.75	8.50	8.90	8.55
10	19.25	19.00	58.25	8.75	8.50	9.00	8.65

NEW YORK, Feb. 10.

An easier tone has developed in several of the markets and demand has been light in nearly all of them. Of course a predominating factor is still the value of foreign exchange. Buying of copper is extremely light and prices have eased off. Tin quotations have fallen with the decline in foreign exchange to fairly low levels and buying has been very light. The tone of the lead market is strong and prices are very firm. The foreign situation has had its influence on the zinc market in which demand is fair but prices have declined. Antimony is strong and higher.

New York

Copper.—The tendency among copper consumers has been to hold off, pending the adjustment of present conditions here and abroad. The leading producers are quoting electrolytic copper for early delivery at 19c. to 19.25c., with Lake at 19.25c. to 19.50c. In the outside market it is possible to buy electrolytic copper in carload lots and in quantities up to 500 tons at around 18.75c. New York, but the amount available is not believed to be plentiful. Of course it has been impossible to do any export business because of the low and erratic values of exchange on all foreign countries. We quote electrolytic copper for early delivery at 19c., New York, and Lake at 19.25c.

Tin.—On Feb. 4 the pound sterling fell to the lowest value in American dollars on record and as a consequence spot Straits also declined to 56.75c., New York. The foreign exchange situation has been the ruling factor in this market as in the weeks past. Since that date exchange values have stiffened and so have the prices of spot Straits tin until to-day this is quoted at 58.25c., New York, or nearly back to the value a week ago. The market as a whole has been quiet and sales of spot tin have been light. At the low level last week about 200 tons was disposed of. As to future shipments it is difficult for dealers to fix quotations on account of fluctuations in exchange and therefore business is difficult, although some was done yesterday. It is understood that this future shipment business was consummated at about 59c. early in the day, with about 59.75c. asked at the close. The London market is again higher and spot Straits is quoted to-day at £395 10s. per ton, as compared with £386 5s. a week ago. Arrivals of tin thus far this month have been 650 tons and the quantity afloat is reported at 7150 tons.

Lead.—The American Smelting & Refining Co. on Saturday advanced its price ¼c. per lb. to 8.50c., St. Louis and 8.75c., New York, bringing it to the same level as the outside market which has stood at these values for some weeks. Demand is fair and prices are very firm. It is the opinion of some that, while production is improving, consumption is increasing faster than the output and that therefore higher prices are more likely than lower in the next few weeks. Most producers are practically sold up for February.

Zinc.—The fluctuations in foreign exchange have had their effect on this market, but not to the same extent as upon the tin market. Prices have declined nearly ½c. per lb. since last week but to-day they were a little firmer, partly because of a considerably better inquiry from domestic consumers, particularly galvanizers. Some of the latter are reported to be interested in deliveries as far ahead as April or May. Partly because of the heavy sales for foreign account some weeks ago and partly because of the exchange situation there is scarcely any business for export. We quote prime Western for early delivery at around 8.65c., St. Louis, or 9c., New York, with second quarter business obtainable as low as 8.50c., St. Louis, or 8.85c., New York, although some producers would not sell below 8.65c. to 8.70c., St. Louis.

Antimony.—The market is active and higher. Wholesale lots for early delivery are quoted at 11.50c., New York, duty paid.

Aluminum.—The market is unchanged at 31.50c. to 32.50c., New York, for wholesale lots for early delivery for virgin metal, 98 to 99 per cent pure.

Old Metals.—The market is quiet. Dealers' selling prices are reported as follows:

	Cents per lb.
Copper, heavy and crucible	19.00
Copper, heavy and wire	18.00
Copper, light and bottoms	16.50
Brass, heavy	14.00
Brass, light	10.00
Heavy machine composition	19.00
No. 1 yellow rod brass turnings	12.00
No. 1 red brass or composition turnings	16.00
Lead, heavy	7.50
Lead, tea	5.50
Zinc	5.75

Chicago

FEB. 10.—Copper, tin and spelter have been adversely affected by the decline in foreign exchange. In the case of tin, the price has declined because of the shrinkage of the pound sterling, whereas spelter and copper have weakened because export shipments have been held up and forced on the domestic market. Lead is the only metal which has advanced, its strength being attributed to scarcity. Antimony is firm at the comparatively high price of 12.50c. and has moved in fair quantity at that figure. In the old metals there have been few changes, although some grades have reflected the declines in new material and lead pipe has advanced. We quote Lake copper 19.50c. for carloads, tin 59c., lead 8.50c. to 8.62½c., spelter 8.90c., and antimony 12.50c. On old metals we quote copper wires, crucible shapes, 16.50c.; copper clips, 16.25c.; copper bottoms, 15c.; red brass, 16.50c.; yellow brass, 12c.; lead pipe, 6.75c.; zinc, 6.25c.; pewter, No. 1, 37.50c.; tinfoil, 40c., and block tin, 52.50c., all these being buying prices for less than carload lots.

St. Louis

FEB. 9.—The non-ferrous markets have been strong, with lead in car lots quoted at 8.37½c. and spelter at 8.62½c. In less than car lots, lead is quotable at 9c.; spelter, 9.50c.; tin, 65c.; copper, 20.50c.; antimony, 15c. In the Joplin district ores have been stronger, with zinc blende selling at $57 and better per ton, basis 60 per cent; calamine, $35 to $38 per ton, basis 40 per cent, and lead ore, $100 per ton, basis 80 per cent. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 8c.; heavy yellow brass, 10c.; heavy red brass, 15c.; light copper, 13c.; heavy copper and copper wire, 16c.; zinc, 5c.; lead, 5c.; tea lead, 3c.; tinfoil, 43c.; pewter, 35c.; aluminum, 22c.

At the annual stockholders and directors' meeting of the American Metallurgical Corporation, Franklin Trust Building, Philadelphia, the following officers and directors were elected to serve during the coming year: President, F. J. Ryan; vice-president, S. R. Vanderbeck; treasurer, W. L. Taylor; assistant treasurer, J. L. Hawley; secretary, S. H. Ourbacker. The most notable changes are the ascendence of Mr. Ryan to the position of president and the selection of Winslow L. Taylor as treasurer. Mr Taylor is a newcomer into the company. He is also the president of Winslow L. Taylor & Co., a large banking house of Philadelphia. During the last 60 days the corporation has increased its capital from $50,000 to $200,000. This is the third increase in capital in a little over two years and is a general indication of the increase in growth both of the individual corporation and the industry that it represents. It is a specialist in all electro-metallurgical and electro-thermic problems.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

(Prices quoted below represent as closely as they can be given those charged by mills to their regular trade for indefinite shipment. Owing to practical famine in supply of finished steel products and the heavy demand existing, tenders of new business are being made to the mills by jobbers and consumers at higher prices than those quoted below, but as a rule the mills are turning this offered business away.)

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Jan. 1, 1920, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 14c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5½c.; Denver, 99c.; Omaha, 59c.; minimum carload 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; St. Paul and Minneapolis, 49.5c.; minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not noted above rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 2.70c.

Wire Products

Wire nails, $3.25 to $4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50, and shorter than 1 in., $2.00. Bright basic wire, $3 to $3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3 to $3.50; galvanized wire, $3.70 to $3.95; galvanized barbed wire and fence staples, $4.10 to $4.45; painted barbed wire, $3.40 to $3.75; polished fence staples, $3.40 to $4.50; cement-coated nails, per count keg, $2.85 to $3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.15 base
Large boiler rivets.....$4.25
Small rivets, ¼ in., 5/16 in. and 7/16 in. diameter, 50 per cent off list
Machine bolts, hp. nuts, ⅜ in. x 4 in.:
Smaller and shorter, rolled threads.50 and 10 per cent off list
Cut threads .....50 per cent off list
Larger and longer sizes.....40 and 50 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....40 and 5 per cent off list
Larger and longer.....35 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.45 and 5 per cent off list
Cut threads .....40 and 5 per cent off list
Larger and longer sizes.....30 and 10 per cent off list
Lag bolts .....50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3.....50 per cent off list
Plow bolts, Nos. 4 to 10.....50 plus 20 per cent off list
Hot pressed nuts, sq. blank.....2.50c. per lb. off list
Hot pressed nuts, hex. blank.....2.50c. per lb. off list
Hot pressed nuts, sq. tapped.....2.25c. per lb. off list
Hot pressed nuts, hex. tapped.....2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank.....2.50c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped....2.25c. per lb. off list
Semi-finished hex. nuts:
⅝ in. and larger .....65 per cent off list
9/16 in. and smaller.....70 and 10 per cent off list
Stove bolts in packages.....75-10 per cent off list
Stove bolts in bulk.....75-10-2½ per cent off list
Tire bolts .....60-10 per cent off list

The above discounts are from Nov. 1, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $52 to $65; chain rods, $65 to $70; screw rivet and bolt rods and other rods of that character, $65 to $70. Prices on high carbon rods are irregular. They range from $75 to $100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ to 9/16 in. and larger, $3.60 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ⅜ in. and 7/16 in., $4.25; 5/16 in., $5; track bolts, $4.90 to $5. Boat and barge spikes, $4.25 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, $3 to $4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 3.00c. from mill. Common bar iron, 4.00c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	1	+25
½	51	36½	⅜	25½	+ 1½
¾ to 3	54	41½	½	29½	11½
			¾ to 1½	34½	18½
			2 and 2½	33½	17½

Lap Weld

2	47	34½	1¼	24½	9½
2½ to 6	50	37½	1½	31½	17½
7 to 12	47	33½	2	28½	14½
13 and 14	37½		2½ to 6	30½	17½
15	35		7 to 12	27½	14½

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	¼	+7	+40
½	48	35½	⅜	23½	6½
¾ to 1½	52	39½	½	28½	15½
2 to 3	53	40½	¾ to 1½	34½	19½
			2 and 2½	34½	19½

Lap Weld, extra strong, plain ends

2	45	33½	1¼	21½	6½
2½ to 4	48	36½	1½	27½	13½
4½ to 6	47	35½	2	29½	16½
7 to 8	43	29½	2½ to 4	31½	19½
9 to 12	38	24½	4½ to 6	30½	18½
			7 to 8	22½	10½
			9 to 12	17½	5½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	40½	1¾ and 1⅞ in.	+20
2½ to 3¼ in.	30½	2 and 2¼ in.	+10
2¼ in.	24	2½ and 2¾ in.	+ 1
1¾ to 2 in.	19½	3 and 3¼ in.	— 1½
		3½, 4 and 4½ in.	— 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅜ in.	257	2¾ to 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

Blue Annealed—Bessemer

	Cents per lb.
Nos. 8 and heavier	3.50 to 4.00
Nos. 9 and 10 (base)	3.55 to 4.05
Nos. 11 and 12	3.60 to 4.10
Nos. 13 and 14	3.65 to 4.15
Nos. 15 and 16	3.75 to 4.25

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	4.15 to 4.65
Nos. 22 to 24	4.20 to 4.70
Nos. 25 and 26	4.25 to 4.75
No. 27	4.30 to 4.80
No. 28 (base)	4.35 to 4.85
No. 29	4.45 to 4.95
No. 30	4.55 to 5.05

Galvanized, Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70 to 5.20
Nos. 12 and 14	4.80 to 5.30
Nos. 15 and 16	4.95 to 5.45
Nos. 17 and 21	5.10 to 5.60
Nos. 22 to 24	5.25 to 5.75
Nos. 25 and 26	5.40 to 5.90
No. 27	5.55 to 6.05
No. 28 (base)	5.70 to 6.20
No. 29	5.95 to 6.45
No. 30	6.20 to 6.70

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	4.15 to 4.65
Nos. 17 to 21	4.20 to 4.70
Nos. 22 to 24	4.25 to 4.75
Nos. 25 to 27	4.30 to 4.80
No. 28 (base)	4.35 to 4.85
No. 29	4.40 to 4.90
No. 30	4.40 to 4.90
Nos. 30½ and 31	4.45 to 4.95

PERSONAL

James A. Green, president Matthew Addy Co., Cincinnati, has been appointed a member of the committee on method of handling trade acceptances, a joint committee of the American Bankers' Association and the American Acceptance Council. The committee is to make a study on the general subject of handling trade acceptances in both banks and business houses. H. K. Dexter, assistant treasurer Firestone Tire & Rubber Co., Akron, Ohio, is also a member of the committee.

J. Doane, Norwood Engineering Co., Florence, Mass., has severed his connections with that organization to engage in business for himself in Springfield. He will give special attention to grinding machines.

Homer L. Ferguson, Newport News Dry Dock & Shipbuilding Co., addressed about 1000 members of the Boston Chamber of Commerce and guests at a luncheon at the Copley-Plaza, Feb. 3, his subject being "The Future of Industrial Employment."

Harry L. Rownd, vice-president of the Republic Iron & Steel Co., Youngstown, Ohio, has been appointed chairman of the executive committee of a canal board of fifty-seven members formed in that city to further the Ohio River-Lake Erie Canal project in the district between Cleveland and Pittsburgh. Prominent steel makers are represented on the committee, which proposes to conduct a comprehensive campaign for the project.

George I. Rockwood, Rockwood Sprinkler Co., Worcester, Mass., has given $50,000 for the endowment fund of the Worcester Polytechnic Institute.

Charles F. Brooker has been made chairman of the board of directors of the American Brass Co. John A. Coe succeeds Mr. Brooker as president. John P. Elton is vice-president of the board and first vice-president. Clifford F. Hollister becomes treasurer and Edmund H. Yates, secretary. F. E. Weaver is vice-president, in charge of sales, at Waterbury, Conn.

The New Departure Mfg. Co., Bristol, Conn., has just made the following promotions: George A. Shepard, plant engineer of Plant C, has become plant engineer for the Meriden division; Paul D. Baldwin, office manager at Plant C, has received the corresponding position in Plant D, Meriden; C. C. Stevens becomes chief draftsman of the mechanical department at Plant A; S. E. Stockwell has been promoted from superintendent to division manager of Plant C.

W. H. Lemont has been appointed safety director of the plants of the Wheeling Steel & Iron Co., Wheeling, W. Va., with offices at Benwood.

A. M. Moreland, H. G. Parker and William H. Scanlon, formerly with the Iron Trade Products Co., Pittsburgh, have organized a new company under the firm name of A. M. Moreland & Co., with offices in the Jenkins Arcade, Pittsburgh. The new concern will deal in pig iron, steel, alloys and fuels.

A. R. Petterson, formerly with the engineering department of the Osgood Bradley Car Co., Worcester, Mass., is now acting as chief engineer and director of production for the Allen Spindle Corporation, Boston. Previous to his connection with the Bradley company, Mr. Petterson was president and general manager of the Petterson Engineering & Mfg. Co., designer and builder of special machinery, tools and jigs.

Fred E. Tasker has resumed his patent law practice, after an interruption of several months due to the war. His offices are in St. Paul Building, 220 Broadway, New York.

Joseph A. Williams, Fore River plant, Bethlehem Shipbuilding Corporation, Ltd., has resigned to accept a position with the New York Shipbuilding Corporation, Philadelphia. Mr. Williams is an industrial engineer.

Benjamin Talbot, Cargo Fleet Iron Co., Middlesbrough, England, accompanied by John E. James, general works manager of the company, has arrived in this country for a visit to various steel plants.

H. G. Stephens, Eastern manager Republic Creosoting Co., Indianapolis, Ind., has resigned to accept an executive position with the Alignum Co. N. Rockwell, representative of the Republic company in Detroit, has been promoted to this position and has had charge of the Eastern office in Philadelphia since Feb. 1. E. G. Day, Buffalo, now has charge of the Detroit office vice N. Rockwell. E. E. Bolte has been appointed manager of the Chicago office in place of Mr. Eifel, who resigned.

Hjalmar E. Skouger has returned to private practice as consulting industrial engineer, having recently severed his connection with Guggenheim Brothers, Chile Exploration Co. and Braden Copper Co., for whom he was designing engineer for the past seven years.

Thomas N. Mehan, for the past eight years with the Electric Appliance Co., has joined the sales organization of Paul W. Koch & Co., Chicago, distributers of the "Jiffy" adjustable cutter, "Jiffy" speed punch, and other specialties.

Luther A. Davis has joined the Pressed Steel Co., Cleveland, having been formerly production superintendent of the Standard Screw Co., Corry, Pa.

L. H. Miller, formerly designing engineer with the Babcock & Wilcox Co., Barberton, Ohio, has become mechanical engineer with the Cromwell Steel Co., Lorain, Ohio.

W. D. Hemmerly, formerly with the Acme Wire Co., New Haven, Conn., has joined the Thompson & Lichtner Co., Boston, as consulting engineer in industrial management and construction.

Walter B. Eichleay was recently elected president of the Monongahela Iron & Steel Co., Pittsburgh. He is also secretary and treasurer of the John Eichleay, Jr. Co., Pittsburgh, steel fabricator.

Thomas J. Fitzgerald, formerly chief engineer Midvale Steel & Ordnance Co., Eddystone Rifle Plant, Eddystone, Pa., has become vice-president and works manager of the Sturdi-Truck Mfg. Co., Holyoke, Mass.

John J. Eyre has become designing engineer with the Simplex Wire & Cable Co., Cambridge, Mass. He was factory engineer with the Sturtevant Aeroplane Co., Boston.

Upon the expiration of his term as president of the United Engineering Society, Charles Frederick Rand was presented framed resolutions appreciative of his accomplishments by the Council of the American Society of Mechanical Engineers. He has been member of the board of trustees of the United Engineering Society for six years, the first two as a representative of the American Institute of Mining Engineers, and the last four in the presidential chair. Mr. Rand is widely known as a mining engineer. In 1913 he was decorated by the King of Spain for his mining accomplishments in that country. That year he was president of the American Institute of Mining and Metallurgical Engineers.

The Phoenix Iron Works Co., Meadville, Pa., announces the appointment of K. B. Thorndike as sales engineer, in charge of its New York office, Fifth Avenue Building; also the opening of its Boston office in the Old South Building, with Paul C. Rodgers, district sales manager, in charge.

E. R. Kenner, formerly district manager in the South and Southwest for the Wellman-Seaver-Morgan Co., Cleveland, has been changed to the home office to assist H. P. Glidden, engineering sales manager.

W. C. Reitz, secretary and treasurer Pittsburgh Steel Products Co., has been appointed a member of the Lake Erie & Ohio Canal Board of Pennsylvania, to succeed W. U. Follansbee of Follansbee Brothers Co. of Pittsburgh, who resigned recently.

William R. Gummere, who for several years represented the Independent Pneumatic Tool Co., Chicago, in Cleveland, has again become affiliated with that company. Mr. Gummere will be connected with the Pitts-

burgh branch, which is under the management of Harry F. Finney.

E. H. Peabody, marine department Babock & Wilcox Co., New York, has resigned to take up independently the development of fuel oil.

Harry Z. Bixler has resigned as chief engineer of the Brier Hill Steel Co., Youngstown, Ohio, to become identified with a new development in the puddling process which is to be tried out in the Mahoning Valley. He was formerly chief engineer for the Youngstown Steel Co. W. H. Ramage, assistant chief engineer of the Brier Hill company, succeeds Mr. Bixler. The latter was presented a gold watch by members of his engineering staff.

W. P. Snyder, Sr., chairman Shenango Furnace Co., Pittsburgh, has gone to Palm Beach, Fla., for the winter.

W. A. Thomas, former president Brier Hill Steel Co., Youngstown, Ohio, left for California last week for an extended visit.

Herbert DuPuy, formerly chairman of the Crucible Steel Co. of America, Pittsburgh, who resigned some months ago on account of ill health, is recuperating at Palm Beach, Fla.

A. S. Winter, formerly advertising and sales manager for the William Powell Co., has joined the sales force of the Fairbanks Co., Pittsburgh, and will represent it in southern Ohio.

S. H. Yahres, for 13 years connected with Mackintosh, Hemphill & Co., Pittsburgh, builders of engines, rolling mill and steel works equipment, and for eight years the secretary of that concern, has resigned effective Feb. 1, and about Feb. 20 will leave for Los Angeles, Cal., to remain for some time on account of his wife's health. He was given a farewell dinner at the Fort Pitt Hotel, Pittsburgh, Thursday evening, Jan. 29, at which officials, heads of operating departments and employees of the company to the number of nearly 100 were present. E. H. Haslam of the concern acted as toastmaster, and Mr. Yahres was presented with a handsome pocketbook, containing a draft for a substantial amount, and also some money., He leaves the company with the very best wishes of his former associates for the future.

Charles O. Gustavsen has resigned as foreman of the roll shop of the Lowellville works of the Sharon Steel Hoop Co. to become superintendent of the bar mill of the Canton Sheet Steel Co. He was with the Sharon company three years, and formerly with the Colorado Fuel & Iron Co. at Pueblo, Colo.

John D. Crawford, formerly consulting engineer in charge of research and development, Maryland Pressed Steel Co., Hagerstown, Md., recently joined the Wellman-Seaver-Morgan Co., Akron, Ohio, in an engineering capacity.

Frank A. Turner, chief engineer Becker Milling Machine Co., Hyde Park, Mass., has become chief engineer of the Flexible Automotive Tire Co., Boston.

Severn P. Ker, president Sharon Steel Hoop Co., Sharon, Pa., T. J. Bray, president Republic Iron & Steel Co., Youngstown, Ohio, and S. L. Mather, Cleveland, have been added to the board of directors of the recently organized Electric Alloy Steel Co. at Youngstown, Ohio.

D. Vaughn Waters has left Gould & Eberhardt, Newark, N. J., automatic gear cutting machinery, where he was designing engineer, to join the Ivers-Lee Co., Newark, N. J., as assistant to the chief engineer.

Donald S. Linton has joined Warner & Swasey Co., Cleveland, having formerly been connected with the Pratt & Whitney Co., Hartford, Conn.

Christopher Henderson, for 18 years with the sales department of the Pittsburgh Steel Co., and for the past few years located in its New York offices, has resigned to become connected with Seggerman Brothers, export and import merchants, 91 Hudson Street, New York, as manager of their export steel department.

H. P. Wingert, formerly general purchasing agent of the American Brake Shoe & Foundry Co., is the president of the American Commodities Corporation, 30 Church Street, New York, organized for the purpose of handling pig iron, coke, coal, iron and steel products, scrap iron, etc.

At the meeting of stockholders of the Warren Foundry & Machine Co., Phillipsburg, N. J., on Feb. 9, the following directors and officers were re-elected: Directors, William H. Hulick, A. D. Chidsey, E. J. Fox, Chester Snyder, W. Clayton Hackett, Lee S. Clymer, W. H. Walters; officers, W. H. Hulick, president and treasurer; A. D. Chidsey, vice-president and assistant treasurer; A. L. Reiley, secretary; Shellman B. Brown, superintendent. The annual report showed a very prosperous year.

J. A. McLennan, general superintendent Link-Belt Co., Philadelphia, has resigned to become general manager of the McDonough Mfg. Co., Eau Claire, Wis., which has been reorganized and is now manufacturing machine tools in addition to sawmill machinery and woodworking equipment. Mr. McLennan assumes his new duties Feb. 16.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was re-elected president of the Wisconsin Manufacturers' Association at the annual meeting held in Milwaukee Feb. 4 and 5. George F. Kull, Milwaukee, was re-elected secretary.

E. F. Axner, for 10 years sales representative of the Illinois Steel Co. in charge of pig iron, has resigned to become affiliated with the H. B. Sackett Screen & Chute Co., Chicago.

Claude Parsons of the London and Birmingham offices of William Jacks & Co., Ltd., Glasgow, Scotland, arrived on the steamship *Adriatic* Feb. 8. Mr. Parson expects to spend about a month in a tour of the steel centers of the United States, gathering data on conditions in the production of all kinds of semi-finished material, and making connections with concerns in the non-ferrous field.

OBITUARY

Amasa Stone Mather

AMASA STONE MATHER, member of the firm of Pickands, Mather & Co., Cleveland, son of Samuel Mather, head of that firm, died Feb. 9 of bronchial pneumonia after a week's illness, aged 33 years. He contracted a cold during a recent business trip to New York, and this developed into influenza, and later into pneumonia.

Mr. Mather was born in Cleveland, where he attended the public schools and University School, Cleveland, and later entered Yale University, from which he was graduated in 1908. After finishing his education he took a hunting trip, which circled the globe, and during that trip spent considerable time in Africa hunting big game. He was admitted to the firm of Pickands, Mather & Co. in 1918, and was in charge of the operation of the Lake Superior ore mines of that firm. During the war he took a very active part in the Liberty loan campaigns and other war activities in Cleveland, and later entered the officers' training school at Camp Zachary Taylor, Ky., and had nearly completed his training there when the armistice was signed. He was a member of the Country, Union, Tavern and City clubs and the Cleveland Chamber of Commerce. He was to have accompanied his father to the International Red Cross Conference in Geneva, Switzerland, and had planned to start last week, but the trip was postponed because of the son's illness. He is survived by his wife, two brothers, S. Livingston Mather and Philip Mather, and a sister, Mrs. Robert H. Bishop, Jr.

JAMES W. SEE, Hamilton, Ohio, nationally known as a consulting engineer and patent attorney, died at his home in that city on Jan. 31, from heart trouble, following a week's illness with influenza and pneumonia. Mr. See was born in New York in May, 1850, and began his career as a machinist in the Springfield, Mo., Iron Works shortly after the Civil war, and lo-

cated in Hamilton in 1874, where he was connected with the Niles Tool Works. In 1876 he entered business for himself as a consulting mechanical engineer, later becoming one of the best known patent attorneys in the United States. Mr. See was a contributor to the columns of the *American Machinist* for a great many years, and also published several volumes on telephone engineering. He was a charter member of the American Society of Mechanical Engineers, the Union League Club and the Technical Club of Chicago.

ERNEST T. CLARAGE, president of the Columbia Tool Steel Co., Chicago Heights, Ill., whose death on Jan. 29, was announced in the IRON AGE of Feb. 5, was born at Kalamazoo, Mich., in 1862, and as a young man was employed by Burden Clarage of that city, with whom he learned the machinist's trade. He was later a member of the firm of Thomas Clarage & Sons, following which he went to Chicago to take a position with Fraser & Chalmers. He was subsequently with the Crescent Steel Co. in a sales capacity, following which he managed the Chicago branch of the Halcomb Steel Co. of Syracuse, N. Y. When the latter company was amalgamated with the Crucible Steel Co., Mr. Clarage continued in charge of the Chicago office. In 1904 he promoted and organized the Columbia Tool Steel Co., of which he was president at the time of his death. The company has been highly prosperous under his administration.

MISS KATHRYNE M. HAUN, treasurer of E. F. Houghton & Co., Philadelphia, died Feb. 9 at her home in Philadelphia, after a short illness from pneumonia. She was born in Philadelphia on Jan. 2, 1876. On Sept. 4 last her twenty-fifth anniversary with Houghton & Co. was celebrated at a dinner given by other old employees and executives of the company. Miss Haun was one of the largest stockholders in the concern, which is engaged in the manufacture of industrial oils and leather goods. Through her work in handling the finances of a growing manufacturing concern, Miss Haun was known in banking circles in both the Eastern and Western sections of the country. Her judgment had a weight in the banking and business world such as is seldom accorded a woman.

LOUIS J. MONAHAN, president Universal Motor Co., and vice-president Universal Foundry Co., Oshkosh, Wis., died Feb. 3 of influenza. He was born in Oshkosh Aug. 9, 1876, and in 1902, with John D. Termaat, founded the Termaat & Monahan Co., manufacturer of gas engines. In 1913 they organized the Universal Motor Co., which specializes in self-contained electro-generator units. The foundry department later was incorporated separately as the Universal Foundry Co. Mr. Monahan was a member of the American Society of Mechanical Engineers and the Society of Automotive Engineers.

Funeral services for Joseph A. Brainerd were held at his late home, 13 Upland Avenue, Dorchester, Boston, Feb. 8. Mr. Brainerd spent nearly forty years in the Boston iron and steel business, at one time being the Eastern representative of the Central Iron & Steel Co. and of Worth Bros. For the past 20 years he was a member of the firm of Harrington, Robinson & Co. He was a prominent member of the New England Iron League.

ALEXANDER MCDONALD GRAVER, vice-president Graver Corporation, until recently the William Graver Tank Works, East Chicago, Ind., died at his home in Chicago on Jan. 31, following an attack of pneumonia. Mr. Graver was 37 years of age and had been associated with his brothers in the management of the Graver company for 13 years, as engineer, purchasing agent, sales manager, and finally vice-president and assistant general manager.

ALEXANDER G. WILSON, president and treasurer the Bollman-Wilson Foundry Co., and secretary of the Cincinnati Grinder Co., died at his residence, Ingleside Avenue, Cincinnati, Feb. 5, from pneumonia. Mr. Wilson was 63 years old, and had been a resident of Cincinnati for the past 50 years.

WARREN F. DUSTIN, North Cambridge, Mass., died Jan. 30 at the Massachusetts General Hospital, Boston, from pneumonia, aged 73. Until his retirement last June, Mr. Dustin was manager and treasurer of the John Russell Cutlery Co., Turners Falls, Mass. Funeral services were held Feb. 2 at Mt. Auburn Chapel, Cambridge.

FREDERICK WILLIAM RENSHAW, president the Globe Seamless Steel Tubes Co., Milwaukee, died of pneumonia at his home in Evanston, Ill., on Feb. 1. He was born in Chicago on Feb. 26, 1880. He was a graduate of Harvard Preparatory School and the Sheffield Scientific School of Yale.

A cable dispatch announced the death in Paris of Frederick Holbrook, Boston. Mr. Holbrook was president of the American International Corporation and of Holbrook, Cabot & Rollins Corporation, engineering and contracting, 6 Beacon Street, Boston. He was born in Boston 58 years ago.

JOHN T. WHITEHURST, president Burt Machine Co., 401 East Oliver Street, Baltimore, died of heart disease Feb. 1, in Pittsburgh, where he went on business. He was 70 years of age.

GEORGE A. BATH died at his home in Roxbury, Boston, Feb. 4, age 49. For the past 25 years Mr. Bath had been a manufacturer of enamel ware.

Directors of Electric Alloy Steel Co.

Stockholders of the Electric Alloy Steel Co., Youngstown, Ohio, have filled vacancies on the board of directors by electing T. J. Bray, president of the Republic Iron & Steel Co.; Severn P. Ker, president of the Sharon Steel Hoop Co., and S. Livingston Mather, secretary of the Cleveland-Cliffs Iron Co. President L. J. Campbell has established offices at 200-202 Ohio Hotel Building and has appointed C. V. Reilly, son of W. C. Reilly, general superintendent of the Youngstown Sheet & Tube Co., chief clerk to the president. In addition to manufacturing high speed tool steel and other high grade steels, the company plans to produce special steels for specific purposes. Several sites are under option and sufficient acreage will be acquired at the start to allow for expansion. Output at the beginning will be on a conservative basis.

The company claims to have one of the strongest boards in the district, a majority of its directors being presidents of going companies or recently retired from executive positions.

Initial installation will consist of two basic-lined electric furnaces, one of 1½-ton capacity to produce highest grade steels and for experimental heats and the other of six tons for grades in larger tonnages. To prepare ingots for the finishing mills, a steam hammer will be used instead of a blooming mill. The finishing mills will consist of a four-stand, 16-in. mill and a five-stand, 10-in. mill with hot beds, shears, etc. The plant will have a complement of pickling vats, chipping and grinding apparatus and annealing furnaces. A tilting open-hearth furnace to be used in connection with the electric furnaces in a duplexing operation is planned.

New Patent Policy Proposed

WASHINGTON, Feb. 10.—A bill which is designed to facilitate the use of inventions of employees of the technical bureaus of the Government for industrial purposes, and their application for the benefit of the public, has been approved by the Committees on Patents of both the Senate and House. The bill has the support of President Wilson and Secretary of the Interior Lane and heads of such scientific bureaus as the Bureau of Mines and the Bureau of Standards.

The bill authorizes the Federal Trade Commission to accept and administer for the benefit of the public and the encouragement of industry, inventions, patents and patent rights. At present there is no fixed or general policy dealing with inventions and patents developed by Government employees in the course of their official duties and consequently no governmental administrative machinery for translating such inventions and patents into actual public service.

Short Trade Items

The Columbus Engineering Service, Columbus, Ohio, has just been incorporated under the laws of Ohio, with George D. Barok president. He was formerly superintendent and general manager of the Atchison-Barok Die Tool Co., Columbus. This business has been conducted in the past two years by Mr. Barok, who has been representing leading tool manufacturers and designers of special machinery from Dayton, Ohio, and Cleveland. The new company's attorney is David Postelwaite and the vice-president is Stevens McFadden. The rest of the corporation is composed of leading business men of Cleveland.

E. Arthur Tutein, Inc., 50 Congress Street, Boston, with a capitalization of $350,000 consisting of 3,500 shares, par $100, has been incorporated under Massachusetts laws to deal in pig iron, coal, coke, metals, alloys and articles made in whole or in part of metal. E. Arthur Tutein, Winchester, is president and treasurer. He and Hubert A. White, John M. Bullard and Howard V. Foulke constitute the board of directors. The company will specialize in pig iron produced by the Thomas Iron Co., Easton, Pa.

The G. and R. Foundry & Machinery Co., Terre Haute, Ind., has purchased the Crawford & McCrimmon Co., Brazil, Ind., having a large modern machine shop and foundry. The officers are as follows: President, Sam T. Greenberg; vice-president, Frank H. Reynolds; secretary, Charles Hays; treasurer, H. Stevenson. The change will give much greater facilities to handle increased business and enable the company to manufacture all kinds of commercial grey iron castings up to 20,000 lb. It will also do bronze or brass work. There is a complete modern pattern shop in connection with it. There will be no change in the name of the Crawford & McCrimmon Co.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has increased its coal holdings in Greene County, Pa., to 8640 acres by the purchase of 1171 acres from W. A. Jones and A. Plummer Austin, Uniontown, Pa., for $819,700, or $700 an acre. At Nemacolin, Pa., the company has one of the largest and most modern mines in the country, developed in the past three years. A model town site for its miners was built adjacent. A railroad spur five and one-half miles long, to connect with the main branch of the Pennsylvania Railroad, will be completed this spring.

The Electric Alloy Steel Co., Youngstown, Ohio, has increased its capital from $1,500,000 to $3,000,000, of which $2,000,000 will be issued, states President Louis J. Campbell. This amount has been practically subscribed for. Construction of its plant to manufacture high speed and special analysis steels will commence as soon as weather conditions permit. The company's capital consists entirely of common stock, par value $100.

The Fahnestock Mfg. Co., Avonmore, Pa., maker of acid open-hearth steel castings, has asked bids for the erection of an extension to its main steel foundry, 130 x 140 ft., with crane runways in three spans, and has placed contracts for additional air compressors and pneumatic equipment. Plans call for the purchase of additional open-hearth furnaces, molding machines and other machinery, which will double the present steel casting output of the plant.

Work at the Quincy plant of the Fore River Shipbuilding Corporation is slowing up, the number employed there now being down to approximately 6000. A third giant submarine is being finished, but work on the battleship Massachusetts and the other large Government war vessels has been put over until next summer, owing, in part, to the inability of the corporation to secure plates, etc.

The Crompton & Knowles Loom Works, Worcester, Mass., recently sold about 500 automatic gingham looms to the Lancaster Mills, Clinton, Mass. The Crompton & Knowles corporation has a record amount of business on its books and is endeavoring to increase production by operating its plants evenings.

The Lalance-Grosjean Mfg. Co., Harrisburg, Pa., manufacturer of galvanized metal ware, is planning for the immediate resumption of work at its hot mills. The plant gives employment to about 200 men, and has been closed since the first of the year for repairs and improvements.

The Truscon Steel Co., Youngstown, contemplates the erection of a steel storage warehouse at New Haven, Conn.

Advances in the cost of cast iron pipe have temporarily halted installation of a new water distributing system for Youngstown, Ohio, for which bonds in amount of $600,000 were authorized by city council. The best price for pipe and fittings received by the city, in asking bids, was $71.80 a ton, compared with $51.80 paid a year ago. This would effect a gross increase in cost of the installation of about $150,000, and municipal officials have abandoned the plan.

The Milwaukee Rolling Mill Co. of Milwaukee is the name of a new corporation which filed articles during the past week. The authorized capital stock consists of $1,500,000 of 7 per cent preferred stock and 15,000 shares of common stock with no par value, the total being equivalent to $3,000,000. The incorporators are Fred Vogel, Jr., Walter Kasten and Robert W. Baird, who are officials of the First Wisconsin National Bank and First Wisconsin Trust Co. of Milwaukee. Meager information concerning the enterprise has been divulged so far. It is stated that contracts have been awarded for a sheet mill and all equipment has been placed, but no other information is given.

Seven new units have recently been added to the Judson Iron Works, Oakland, Cal., and are now in operation. Three open-hearth furnaces have been installed and two continuous furnaces, one continuous 19-in. mill and a new rod mill to use the product of the open-hearths have been erected.

The Kenny Foundry & Mfg. Co., Mansfield, Ohio, whose plant was recently damaged by fire to the amount of $50,000 or more, has made no definite plans as yet for rebuilding, but will do so at an early date. The company will likely be in the market for considerable equipment when it starts work building the new plant. It manufactures iron pumps and cylinders and plumbers' iron ware.

The First & Old Detroit National Bank, Detroit, has awarded to the Foundation Co., Detroit, the contract for the bank's office building, which is to occupy the site of the Pontchartrain Hotel, which closed last week. The structure will cost approximately $8,000,000 and will be 24 stories.

A newly organized company entering into the scrap-iron and steel business and also handling by direct mill representation sheets, plates, shapes, bars, etc., is the R. E. Crank Co., composed of R. E. Crank, formerly with the Bethlehem Steel Co.; Frank C. Spruance, formerly of the Marine Decking & Supply Co., and M. H. Felty, formerly connected with the Hofmann-Sproul Co. The offices are at 1001 Chestnut Street, Philadelphia.

The 9-in. mill of the Duncannon, Pa., plant of the Lebanon Valley Iron & Steel Co. was placed in operation last week. The 12-in. mill and furnaces, which were started several weeks ago when the plant resumed operation after being closed since spring, are now operating on double time.

The year will not be old before Alabama will have 334 additional by-product coke ovens as follows: 154 Koppers of the Tennessee company, of which 77 are already in operation; 120 Semet-Solvay of the Sloss-Sheffield company and 60 Koppers of the Birmingham Coke & By-products Co.

Machinery Markets and News of the Works

ACTIVITY IN ALL MARKETS

Buying of Tools Hastened by Price Advances

Automotive Industries Continue a Large Factor in Current Business—Some in Trade Detect Falling Off in Inquiry

The marked activity of the machinery markets in the past few weeks has been in large measure due to the advances in prices, many sellers giving prospective customers brief protection on outstanding quotations. The result was a scramble to place contemplated orders before the price went up.

As an aftermath to this activity dealers and factory representatives in different sections of the country note a falling off in inquiries. If a period of slackened activity is now at hand, it would not be unwelcome to the trade, which would then be given an opportunity to catch up on its commitments, which extend in most instances for several months.

Buying has been in notable volume. Here and there, however, are signs of hesitancy. At Philadelphia, for example, two or three projects, involving fairly large purchases of machine-tool equipment, are held up owing to the tightness of money. At Boston some prospective buying of fair magnitude was held up owing to conditions arising from the snow blockade. It is also noted in New England that for the first time since the end of the war the Government has become a real factor in the situation, its sales of machine tools running into large figures.

One of the large buyers in the East is the Columbia Graphophone Co., Bridgeport, Conn., whose purchases of metal and woodworking machines for its new plants at Baltimore, Md., and Toronto, Ont., will total several hundred thousand dollars.

Otherwise Eastern buying has been largely from the automotive industries. The International Motor Co., the Mercer Automobile Co. and the American-La France Fire Engine Co. have placed orders. The latter company is buying for its new plant to be built at Bloomfield, N. J.

Fiat of Turin, Italy, has placed orders through its New York office for considerable equipment for its new automobile manufacturing plant. In the past six months the Italian company has bought about $900,000 worth of machine tools in the United States. Its total requirements are about 1000 machines, but the unfavorable exchange rate will prevent the placing of all of this business in this country. About 130 tools have been bought and the total to be ordered in the United States is about 400 to 500.

New York

NEW YORK, Feb. 10.

Some sellers of machine tools seem to detect a slight falling off in inquiry and orders during the past week, but this observation is by no means general as quite a number of dealers and factory representatives have been booking business at about the same rate as during the past 60 days or more. It is yet too early to determine whether the unsettlement due to the foreign exchange situation and the tightness of the money market will have any appreciable effect upon the machine-tool industry. Such slackness as was noted by some in the trade during the past week may have been due in part, at least, to the generally demoralized transportation condition in the East which resulted from heavy snow storms. It is worthy of note, however, that there is a feeling in some quarters that the enormous buying of the last two months cannot long be maintained. This, of course, would not be greatly disturbing to the many machine-tool companies whose output for several months is contracted for, but the question of cancellations might again come to the front in case of any pronounced business slump. One large seller of machine tools is protecting itself against cancellations by a stronger provision in its sales contracts. Although this particular company accepted cancellations from its customers during the period of readjustment immediately following the signing of the armistice, it declares that the action taken then must not be accepted as a precedent. The most this company will agree to do is to resell tools, but customers must accept the responsibility and shoulder any loss resulting.

Much of the business of the last two weeks is attributed to the general advance in prices. A number of sellers protected their customers for a few days on outstanding quotations, and there was a general scramble on the part of prospective buyers to take advantage of the short period of grace permitted to them. Machine-tool prices are now quite the highest ever known. Some companies have made two advances within the past 30 or 60 days. An extreme case is two advances by one company in little more than two weeks.

One of the largest buyers is the Columbia Graphophone Co., Bridgeport, Conn., which has begun the placing of orders for its new plants at Toronto, Ont., and Baltimore, Md. The equipment required for these two plants will aggregate several hundred thousand dollars in value. For the Baltimore plant a large lot of woodworking machinery will be purchased.

Another Bridgeport company, the Crane Co., has bought considerable new equipment, mostly turret lathes and screw machines for plumbing fixtures.

The American La France Fire Engine Co., Elmira, N. Y., is purchasing equipment for its new plant to be built at Bloomfield. The new equipment is principally for the manufacture of motor trucks. The International Motor Co. is buying more equipment for its plants at Plainfield and New Brunswick, N. J., and Allentown, Pa. A part of the equipment at the New Brunswick plant, which was acquired from the Wright-Martin Aircraft Corporation, will probably be disposed of and replaced by new tools. A new automobile concern for the East is the Murray Motor Car Co., which is moving its plant from Pittsburgh to Newark, N. J. Most of the machine-tool equipment is being brought from Pittsburgh, but it is expected that purchases of some new equipment will be made. The office of the company is in the Niagara Building, Newark.

The Mercer Automobile Co., Trenton, N. J., is buying a list of tools.

The Dunlop-America Co., Ltd., 19 West 44th Street, New York, which will build a tire manufacturing plant at Buffalo, is in the market for several boring mills and other equipment.

The Savage Arms Corporation, Utica, N. Y., which will engage in the manufacture of roller bearings, made inquiries for machine tools a few weeks ago and is about to place orders. A considerable number of internal grinders will be among the tools bought.

Among other domestic buyers are the Oxweld Acetylene Co., Newark, and the American Die & Tool Co., Reading, Pa. The latter company has been buying steadily since the first of the year. Considerable other business is pending, including one prospective order for about $100,000 worth of multiple spindle drilling machines and $125,000 worth of standard miscellaneous tools, which a dealer will exchange practically on an even basis for used tools.

In the export field the principal buyer is Fiat, the Italian automobile manufacturing company, whose New York office is at 501 Fifth Avenue, H. T. Clinton being purchasing manager. Recent purchases are about 20 turret lathes and a

number of special milling machines. In all, the company has placed orders in the United States within the past six months for about $900,000 worth of machine tools. About 50 machines have been shipped and about 80 more have been ordered. In all, the company will require about 1000 machine tools, but owing to the foreign exchange situation only about 400 to 500 will be bought in this country. The equipment purchased includes the newest types of production and precision machinery, including special boring and drilling machines made by a Cleveland company. The tools are for an extensive enlargement of the Fiat plant, which was begun during the war, and which is now being completed. The company was recently recapitalized with stock of 200,000,000 lira and much of the new capital is being expended for extensions. A new machine shop and assembly building, 1673 ft. long, 265 ft. wide and five stories and another building for general offices and the technical departments is 328 ft. long, 56 ft. wide and five stories. On the roof of the larger building is a circular track for the testing of automobiles. The expansion includes other shops for various departments, such as drop forgings, steel castings, etc., the latter being made in electric furnaces, of which 15 of the company's own design have been installed. The new plant is at Lingotto, Italy, a suburb of Turin. Before the war the company had an annual output of 6000 to 8000 passenger automobiles. When full production is reached in the new plant about 60,000 cars a year will be the capacity. At present the plant is turning out 100 cars a day. The improvements under way were started during the war period when demands for motor trucks, lories and passenger automobiles for the Italian army became enormous. The company turned out 65,000 trucks for the Italian Government during the war. In addition to machine shops, forge shops, etc., the company has its own body-making department, for which large presses have recently been bought in this country.

Crane sales continue good with a number of small inquiries in the market. Most manufacturers have advanced prices since the first of the year, quoting from 5 to 10 per cent more. Dredging work has started on the new ship repair plant at Boston. Covering about 14 acres, the plant will include two 10,000-ton dry docks, a machine shop, plate, angle and boiler shop, metal shops, a pattern shop, storage building, maintenance and repair shops and a power house and substation. All mechanical equipment will be electrically driven, according to J. L. Byrne, contracting engineer, 53 State Street, Boston. Development of port facilities at South Providence, R. I., is being seriously considered and tentative plans have been drawn for three 1000-ft. piers on the property of the New Haven Railroad. Plans are in charge of Jonathan Starr, New London, Conn., representing the Eastern Terminal Corporation, engaged in constructing warehouses in New York, New Haven, Boston and Providence. Contract has been let by the city of Camden, N. J., for the construction of two 350-ft. piers on the Delaware River. Plans call for the expenditure of about $3,000,000 on a marine terminal.

Among recent inquiries are: The Sperry Gyroscope Co., Brooklyn, 10-ton, 50-ft. span, overhead traveling crane; E. I. du Pont de Nemours & Co., Wilmington, Del., one 15-ton, 52-ft. span and two 4-ton, 35-ft. span, overhead traveling cranes; New York Municipal Railways, 85 Clinton Street, Brooklyn, 5-ton, overhead traveling crane; Pennsylvania Railroad, 5-ton hand power crane for Broad Street Station, Philadelphia.

Sales of cranes include: McIntosh-Seymore Co., Auburn, N. Y., two 30-ton and one 5-ton, overhead traveling cranes and a 16-ton trolley from Niles-Bement-Pond Co.; Sheldon Axle & Spring Co., Philadelphia, a 7-ton bucket handling, gantry crane from Champion Engineering Co.; Lima Locomotive Corporation, Lima, Ohio, one 25-ton, 80-ft. span, overhead traveling crane from the Champion Engineering Co. The Shepard Electric Crane & Hoist Co. has sold the American Car & Foundry Co. twenty-one 2 and 5-ton electric hoists and the Bethlehem Steel Co. one 5-ton grab bucket crane. The following sales have been made by the Chesapeake Iron Works: Hudson Motor Car Co., Detroit, one 5-ton, 17-ft. span, overhead traveling crane; Novelty Steam Boiler Works, Baltimore, one 15-ton, 50-ft. span; Bartlett, Hayward & Co., Baltimore, one 12½-ton, 20-ft. span and Caroline Foundry Co., Baltimore, one 15-ton, 55-ft. span. The Hartford Rubber Works, Hartford, Conn., has purchased through Lockwood, Green & Co., Boston, eleven 10-ton and nine 2-ton hand-power cranes from the New Jersey Foundry & Machine Co. The American Brake Shoe & Foundry Co., New York, has purchased one 5-ton, overhead traveling crane from the Northern Engineering Co.

The Universal Metal Parts Mfg. Co., 602 West Fifty-second Street, New York, recently incorporated for $10,000, is specializing in the manufacture of sheet-metal automobile parts. S. A. Lichtenstein, president, was formerly secretary of the Murray Auto Parts Mfg. Co., Cincinnati, and G. Meyer, treasurer, was treasurer of the Military & Naval Supply Co., New York. J. Mumaw, superintendent, was formerly superintendent of the Murray Auto Parts Mfg. Co.

Waldron & Van Winkle, 37 Wall Street, New York, industrial engineers, have been retained by the Middletown Rubber Co., Middletown, N. Y., to prepare plans for a three-story concrete and steel factory of 60,000 sq. ft. floor space, including power plant and layout of machinery for the production of at least 1000 cord tires and inner sleeves per day. Major Edward Van Winkle is in charge.

C. R. Curtis, Newark, N. J., formerly connected with the Splitdorf Electrical Co., 98 Warren Street, has perfected the organization of a company to manufacture electric equipment and accessories for automobiles, and has awarded a contract to the American Concrete Steel Co., 27 Clinton Street, for a plant to be located on the site of the former Hedenberg Iron Works, Warren, Plane and Hackett streets. The first unit will be eight stories, L shaped, 60 x 172 ft., of reinforced concrete, and with equipment is estimated to cost $500,000. It is expected to have the building ready for occupancy early in June. A second unit will be about 56 x 160 ft., and will be followed by other buildings until the entire site, 192 x 370 ft., is utilized.

The American Automobile Body Mfg. Co., Newark, N. J., has filed notice of organization to operate a plant at Commerce and Market streets. Conrad C. A. Reetz, 820 Grove Street, Elizabeth, is president.

The James T. Clark Co., 70 Adams Street, Newark, N. J., manufacturer of castings, has had plans prepared for a one-story addition, 67 x 70 ft., to cost $22,000.

The British-American Metals Co., Plainfield, N. J., has completed plans for a one-story addition, 40 x 80 ft.

Officials of Manning, Maxwell & Moore, Inc., 119 West Fortieth Street, New York, manufacturer of machine tools, cranes, etc., have organized the Western Manning, Maxwell & Moore Co., with nominal capital of $10,000 to manufacture machine-shop and foundry equipment. The incorporators are P. M. Brotherhood, A. J. Babcock and G. D. Branston.

The Eastern Potash Corporation, 120 Broadway, New York, has commenced the erection of a potash and by-products plant on the Raritan River, vicinity of New Brunswick, N. J. The works will consist of 14 buildings, including structures for mechanical work; a machine shop, 100 x 300 ft., a steam-operated electric power plant, etc. Water-tube boilers, steam turbines and auxiliary equipment will be installed. Complete loading and unloading equipment, with overhead structural steel bridge, will be installed, including hoisting and conveying apparatus. The output at the plant will consist of about 150 tons of potash per day, and by-products. E. L. Blood, engineer, is in charge of construction.

The Vic Mfg. Corporation, Carlstadt, N. J., has been incorporated with a capital stock of $10,000 by Abraham A. Hoffman, Benjamin H. Licht and J. Danziger to manufacture machinery.

A one-story power plant to cost $20,000 is planned by the Village Investing Co., Bronxville, N. Y., to be located on Fairfield Road.

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has been consolidated with the Montour Hoist Corporation, Elmira, under the former name, with an active capital of $1,250,000. The incorporators are S. G. H. Turner, F. M. Blistone and F. W. Swan, Elmira.

The Twin-Energy Motors Co., Albany, N. Y., recently incorporated, is having plans prepared for a three-story plant to cost in excess of $500,000, including equipment. W. H. Van Guysling, 1 Clinton Square, is the architect. W. H. Schneider, 142 State Street, is interested in the company.

Edwards & Co., Exterior Avenue and 140th Street, New York, manufacturer of electrical products, is considering plans for a two-story addition, 61 x 95 ft.

The Vesta Storage Battery Co., 1696 Broadway, New York, is planning for a repair service works at 47-49 West Sixty-third Street.

The United States High Speed Tool Corporation, Toledo, Ohio, is considering plans for a four-story plant near Albany, N. Y.

The H. M. Davis Mfg. Co., Brooklyn, has been organized by H. M. and E. R. Davis, and C. W. Boyden, 553 West Eighteenth Street, to manufacture presses for baling, etc.

The Buick Motor Co., 1733 Broadway, New York, has acquired property at 218-220 West Eighty-fourth Street under a 21-year lease and will remodel the building for a service and repair shop. The rental aggregates $200,000.

The Eagle Corrugated & Fibre Products Corporation, Brooklyn, has been incorporated with a capital stock of $100,000 by M. Feldman and D. Geller, 715 Broadway, New York.

The Westinghouse Lamp Co., 165 Broadway, New York, has awarded a contract to Stone & Webster, Milk Street, Boston, for an addition to its plant at Milwaukee, Wis.

The Militor Corporation, 111 Broadway, New York, manufacturer of motor products, is arranging for a change in company name to the Sinclair Motors Corporation. Neil R. Sinclair is president; and George Nicol, secretary.

The Alfred P. Kingston Last Mfg. Co., Utica, N. Y., has been incorporated with a capital stock of $75,000 by Alfred P. Kingston, J. A. Smith and F. P. McGinty, to manufacture metal lasts.

The American Motors Co., West Front Street, Plainfield, N. J., is having plans prepared for a two-story brick addition, 165 x 300 ft., to cost $200,000, including equipment.

The Perth Amboy Dry Dock Co., Perth Amboy, N. J., will build a steel frame machine shop to cost $57,800.

A one-story brick and concrete machine shop and mechanical building, 68 x 236 ft., will be erected by the Warren Mfg. Co., Milford, N. J., manufacturer of rope and glassine paper, etc., in connection with a new addition.

A one-story power plant to cost $12,000, exclusive of equipment, will be erected by the Philippine Vegetable Oil Co., foot of Twelfth Street, Jersey City, N. J.

The building, 50 x 100 ft., to be erected by the Queensboro Tool & Die Co., 136 West Avenue, Long Island City, N. Y., on Fifth near Washington Avenue, will be used as a machine shop.

The Empire City Iron Works, 898 Eighth Avenue, New York, has plans under way for a two-story plant on Tenth Street, near East Avenue, Long Island City, to cost $20,000. Frank Moos, 896 Eighth Avenue, is the architect.

The Spaulding Chain Corporation, New York, has been incorporated with a capital stock of $50,000 by E. P. Burtis, H. F. Heberman and T. W. Robertson, 43 Cedar Street, to manufacture chains, etc.

The E. H. Machine Co., 234 Maple Street, Weehawken, N. J., has filed notice of organization to manufacture machinery and parts, and operate a general machine works. Everett Hubelmeyer is president.

The New York Bearings Co., New York, has been incorporated with a capital stock of $75,000 by H. Gass, J. and W. Walzer, 831-A Lafayette Avenue, Brooklyn, to manufacture ball bearings.

The Consensite Co. of America, Bloomfield, N. J., manufacturer of insulation, is considering plans for an addition.

The Millville Cast Iron Products Co., East Main Street, Millville, N. J., has completed plans for a one-story crane building, 75 x 150 ft., at Eighth and Railroad streets, to cost $25,000.

The Lionel Mfg. Co., 605-9 South Twenty-first Street, Irvington, N. J., manufacturer of batteries, mechanical toys, etc., has had plans prepared for a four-story addition, 75 x 82 ft., to cost $50,000.

The Barnett Foundry & Machine Co., Lyons Avenue, Irvington, N. J., has filed plans for a plant addition.

The Continental Can Co., 616 West Forty-third Street, New York, is completing plans for a four-story and basement, reinforced-concrete plant, to occupy the block bounded by Fifteenth, Sixteenth, Cole and Monmouth streets, Jersey City, N. J., to cost about $750,000, including equipment. Francisco & Jacobus, 511 Fifth Avenue, New York, are the engineers.

The Metropolitan Metal Forming Co., New York, has been incorporated with a capital stock of $200,000 by M. E. Isenman, P. F. Grossness and S. A. Blate, 37 West Thirty-seventh Street.

The Interborough Rapid Transit Co., 165 Broadway, New York, has completed plans for a one-story power plant, 50 x 90 ft., at Westchester Avenue, near St. Peter's Avenue, to cost $50,000.

Philadelphia

PHILADELPHIA, Feb. 10.

While there has been a fair amount of machine-tool business in the past two weeks, at least two or three industrial projects, which involve fairly large purchases of tools, are held up pending developments in the money situation. Tightness of money has become more than a stock market feature, the conservatism of bankers extending to loans for legitimate enterprises as well. The Link-Belt Co., Philadelphia, has bought several tools. The Sheldon Axle & Spring Co., Wilkes-barre, Pa., has bought about $50,000 worth of equipment for its forge shop. Other buying has been in good volume, but generally in small lots or single machines.

The Taylor Spring & Equipment Co., 1722 Fairmount Avenue, Philadelphia, will remodel an adjoining two-story building, 64 x 100 ft., for an addition.

Plans have been filed by Gillinder & Sons, Inc., State and Devereaux streets, Philadelphia, for a two-story machine shop, 39 x 61 ft., at their glass plant, to cost about $20,000.

The Baldwin Locomotive Works, Broad and Spring Garden streets, Philadelphia, has acquired the three-story building, 100 x 104 ft., at Eighteenth and Hamilton streets, for use in connection with its works.

The plant to be erected by the Belmont Packing & Rubber Co., 133 North Second Street, Philadelphia, manufacturer of mechanical rubber goods, at Janney and Butler streets, will be two stories and basement, 120 x 130 ft., and cost about $100,000 with equipment.

The Abrasive Co., James and Fraley streets, Philadelphia, manufacturer of grinding wheels, has filed plans for a one-story addition, 18 x 48 ft.

Bids will be asked about Feb. 15 for the proposed addition to the plant of Winfield S. Barnes & Co., Twentieth Street and Erie Avenue, Philadelphia, operating a structural iron and steel works, to be located at Thirtieth Street and Erie Avenue. It will be three stories, of brick and reinforced concrete, 100 x 300 ft., estimated to cost $200,000.

The Mercer Motor Co., Trenton, N. J., manufacturer of automobiles, has awarded a contract to the Standard Construction Co., 1713 Sansom Street, Philadelphia, for two plant additions, two stories, 40 x 80 ft., and one story, 60 x 400 ft., to cost $200,000, including equipment.

The A. O. Dewitt Auto Co., Scranton, Pa., is having plans prepared for a two-story service and repair works, 90 x 170 ft., to cost $100,000, including equipment.

The Rowe Mfg. Co., Lancaster, Pa., manufacturer of automobile trucks, is planning to double the capacity of its plant, now averaging about 10 trucks per day. The trucks are being produced in 2, 2½, 3, 4, 5 and 6-ton capacities. S. J. Rowe is president; and J. K. Ressler, treasurer.

Fire, Jan. 29, destroyed the machine shop of William Kebbe, Lumberville, Pa., with loss estimated at $10,000.

The Scranton & Binghamton Railroad, Scranton, Pa., is having plans prepared for an addition to its power plant, 48 x 70 ft., to cost about $95,000, including equipment.

The Pennsylvania Refractories Co., Scranton, Pa., has been incorporated with a capital stcok of $75,000 by F. W. Wollerton and associates.

The Belmont Motors Co., Lewiston, Pa., is planning for the installation of new machine tools and other equipment.

The B. & B. Mfg. Co., Archibald, Pa., has been incorporated in Delaware with a capital stock of $25,000 by Anthony J. Cavey, John J. Breman and Hugh J. Brady, to manufacture metal products.

The J. C. Hill Co., Allentown, Pa., manufacturer of sheet-metal products, is now occupying a new plant, recently constructed, at 911 North Lumber Street. Two buildings are being used, with one devoted to construction and assembling work. J. C. Hill heads the company.

The Crescent Insulated Wire & Cable Co., Olden and Taylor streets, Trenton, N. J., has awarded a contract to the Trenton Home Building Co., 237 East State Street, for a one-story addition, 50 x 132 ft.

New England

BOSTON, Feb. 9.

Early in the week the local machine-tool trade was all set for heavy purchases of equipment based on several anticipated large individual orders, but the storm upset plans of buyers and sellers alike. On the other hand there has been and is a general inquiry for one, two and three tools, which in the aggregate involves a large amount of invested capital. One feature is noticeable, however, in the machine-tool business and that is the growing willingness of manufacturers to deal with the Government for equipment. In several instances the past week local representatives have lost out on sales because of Government offerings, buyers in quite a few cases going as far as Philadelphia to look at Government-owned tools. This condition is especially noticeable in western Massachusetts, where the call for tools is especially keen and where the Government has large numbers of tools stored and is willing to sell at prices materially below those quoted by makers. Many of these Government owned tools are new, never having been taken from original crates.

Practically all machine-tool manufacturers advanced prices 5 to 10 per cent on or since Feb. 1, a fact that materially has helped the Government to dispose of tools stored in Springfield, Mass., and at other nearby places. The higher prices being asked for new tools has also created more interest in second-hand machines. Local second-hand dealers have transacted a larger business the past week than during any previous six days this year. In a few instances second-

hand prices have advanced on special kinds of tools, but in general quotations remain unchanged.

The demand for small tools probably is heavier than it has been before since the armistice. The long expected advance in drills has materialized, being 10 to 15 per cent. Grinding wheels, chucks, tool holders and, in fact, almost all lines sell freely. Machine screws are more difficult than ever to obtain. The demand for screw machine products is so large that several New England corporations contemplate giving their undivided attention to manufacture of this product.

The Gilbert & Barker Mfg. Co., Springfield, has just bought a long list of tools. It will soon award a contract for additional buildings, including an iron and brass foundry, a 160 x 180 ft. addition to the sheet-metal building, a 220 x 160 ft. building, two floors of which will be devoted to accounting departments and the third floor to recreation rooms, and another addition to the power plant. The company has about two years business on its books and is planning to double its output the next six months. The Storms Drop Forging Co., Springfield, has requirements lined up, but contrary to earlier reports has not covered these and is in the market for a variety of machines. In making purchases the company is exacting on deliveries. The Stevens Duryea Co., Chicopee Falls, Mass., is in the market for machine tools and other equipment and has already expended something like $200,000.

A Boston industry is asking prices on a long list of tools to be used by a branch in the Far East. The Newport Naval Station, R. I., has a list calling for some heavy as well as small tools. A New London, Conn., corporation has a Government contract for motors to be used in submarines, and is inquiring for quotations on a small amount of equipment. One of the largest manufacturers of machine tools in the country contemplates the purchase of a large tool from its competitor, having inspected one of the machines in operation at an Eastern plant. A Massachusetts paper machinery company is interested in a small amount of equipment, and the General Fire Extinguisher Co., Providence, is figuring on automatic tools. The Saco-Lowell Shops has a long list of tools, but has not purchased many machines of late. The Trimount Mfg. Co., Roxbury, Boston, contemplates buying chucks and larger tools.

The American Writing Paper Co., Holyoke, Mass., is buying equipment, and the Northway Motors, Natick, has bought three Porter-Cable lathes and other tools. The Mead-Morrison Mfg. Co. is buying equipment for an Ontario plant recently taken over, but is taking more Government surplus than other tools. The Baush Machine Tool Co., Springfield, is buying Government surplus tools. The Whitins Machine Works, Whitinsville, Mass., has figured in the buying the past week, and the Wetherbee Ignition Co., Springfield, bought a lathe and two or three other tools. The latter company is specializing on ignitions for stationary gas engines. The Westgard Machine Co., Wakefield, Mass.,, recently bought equipment for the production of a new machine for sharpening hack saws, which it is putting on the market. The American Bosch Magneto Corporation, Springfield, is buying tools all the time, but direct from the manufacturers. Knight & Thomas, Inc., Boston, fire extinguisher, is gradually increasing its production program and has bought a little equipment recently. The General Electric Co., Lynn, has again figured conspicuously in the buying since last reports. The United Shoe Machinery Corporation, Beverly, is buying small tools.

The Bantam Anti-Friction Co., Bantam, Conn., is planning to build an addition to its plant in the spring and to double its output.

The Moore Drop Forging Co., Springfield, Mass., which recently sold its entire stock of flat wrenches and the equipment for manufacturing these to the Winchester Repeating Arms Co., New Haven, has been buying equipment. The Westfield Mfg. Co., Westfield, Mass., is to go into the manufacture of screw machine products and has bought automatic equipment recently. The Napier Saw Works, Springfield, Mass., is buying machine tools for speeding up production of a new bandsaw being put on the market and of its general products. It is booked ahead many months. The Springfield Tool Co., East Springfield, Mass., is buying new tools to increase production.

The Spencer Screw Corporation, Springfield, Mass., will increase its floor space by taking over an entire building. Present plans call for a heavy production of screw machine products. It has bought considerable automatic equipment, but has not covered its requirements.

Bids are being received for $650,000 factory improvements at the plant of the Kelley Tire & Rubber Co., Orange, Conn.

A general contract has been let for a two-story, 55 x 85 ft. factory addition, by the Danbury Ball & Roller Bearing Co., Danbury, Conn.

The Aberthaw Construction Co., Boston, has a contract with the Davis & Furber Machinery Co., North Andover, Mass., for a factory.

Work will start as soon as weather conditions permit on a one-story, 40 x 100 ft. foundry for the Colley Wright Foundry Co., Hartford, Vt.

L. E. Waterman Co., fountain pens, is planning to build a factory at Seymour, Conn., six stories, containing about 24,000 sq. ft. of floor space.

The Lynn Machine & Screw Co., Lynn, has been chartered under Massachusetts laws with a capital stock of $75,000. Charles D. C. Moore, Swampscott, is president and treasurer. He and John J. Leonard and Walter H. Murphy, both of Lynn, constitute the oard of directors.

Plans are being drawn for a forge shop for the American Engineering Co., manufacturer of steering apparatus, etc., to be located in New Britain, Conn. It will be one story, 40 x 64 ft.

The plant of the Rogers Drop Forging Co., which recently bought equipment in this market, is located at Leicester, Rochdale, near Worcester, Mass. It is capitalized for $150,000, will carry on the business of mechanical and electrical engineer, machinist and founder, and manufacture tools. Joseph R. Rogers is president; Francis P. Rogers, Jr., treasurer, and John E. Rogers, secretary and clerk.

The Furber Mfg. Corporation, Lynn, capitalized for $100,000, has been given a Massachusetts charter. Frederick M. Furber, 52 Bradstreet Avenue, Revere, is president; Roland T. Parker, 17 Floyd Street, Winthrop, vice-president; and Harry Eisner, 158 Warren Street, Brookline, treasurer. Mr. Furber owns all but 100 shares of common stock of the company. It will manufacture spark plugs, tools, equipment and automobile accessories in general.

W. Hogarth, formerly manager of the Rider Bagg Co.'s machine shop, 51 Taylor Street, Springfield, Mass., has purchased the equipment and assumed the lease of that shop. He will manufacture tools, dies, jigs, fixtures and gages, and plans to double the output before the end of summer by increasing the floor space and installing new machine tools. The name of the new concern has not been decided upon. The Rider Bagg Co. continues to operate the brass foundry at 369 Birnie Avenue.

The Owren Casting Co., Attleboro, with a capital stock of $10,000, has been given a Massachusetts charter. Einar Owren, 4 Sanford Street, is president, and Charles M. Robbins, 47 Bank Street, treasurer. Those two and Walter A. Briggs, 5 Third Street, all of Attleboro, constitute the board of directors.

Waldron & Van Winkle, 37 Wall Street, New York, industrial engineers, are designing a foundry of 30 tons daily capacity for the Windsor Foundry Co., Windsor, Vt.

The American Engineering Co., 200 East Main Street, New Britain, Conn., has completed plans for a one-story forge shop addition, 40 x 64 ft.

The Hartford Tool Works, Inc., Hartford, Conn., has been incorporated with a capital of $75,000 by E. G. Nelson, Hartford; A. A. and A. M. Engstrom, Newington, to manufacture tools and machinery.

Fire, Feb. 2, destroyed a portion of the plant of the Hartford Iron Works, Pleasant Street, Hartford, Conn., with loss estimated at $20,000.

The S. O. S. Welding Co., Providence, R. I., has been incorporated with a capital of $100,000 by George T. Marsh, Frank Healy and Hugo A. Clason, to manufacture welding equipment.

The Moore Drop Forging Co., 39 Water Street, Springfield, Mass., has taken bids for a one-story forge shop addition, 50 x 60 ft., to cost about $60,000, including equipment.

The E. I. du Pont de Nemours Co., Wilmington, Del., is planning for the building of its plant at Windham, Me., recently destroyed by fire with loss estimated at $200,000. It is planned to build a power plant for electric operation of the new works.

Crompton & Knowles, Worcester, Mass., manufacturers of looms and textile machinery, have arranged a building program covering an expenditure of about $300,000. A portion of the work has been completed. Plans are now being completed for the erection of a six-story manufactory on the site of the present forge shop at Worcester, and for other work.

The Racolock Co., New Haven, Conn., has been incorporated with a capital stock of $30,000 by Pasquale Raccio, 183 Lafayette Street, and William Allen, to manufacture locks and other hardware products.

Buffalo

BUFFALO, Feb. 9.

Contract has been awarded by Dunlop-America, Ltd., 19 West Forty-fourth Street, New York, to the Foundation Co., Woolworth Building, New York, for the construction of its American plant on the Niagara River at Buffalo. It will be a subsidiary of the British Dunlop Co. Twelve process buildings for the manufacture of rubber tires and a number of smaller buildings, covering an area of approximately 1,200,000 sq. ft., will be erected and will embody the most modern ideas in pneumatic tire manufacture. S. S. Walcott Dunlop is in charge.

The Jacob Dold Packing Co., Buffalo, will erect a concrete and structural steel train-loading building, 45 x 300 ft., one story, at its plant, William Street, Fillmore Avenue and the New York Central Railroad, to cost $50,000.

The United Accessories Corporation, 100 Broadway, Buffalo, has been incorporated by R. H. Boench, E. H. Murphy and H. H. McCorkle to manufacture automobile accessories, and will establish a plant for the purpose. The capital stock is $100,000.

The International Time Recording Co., Endicott, N. Y., is preparing plans for a three-story reinforced concrete factory extension, 50 x 200 ft., and a boiler plant to cost with equipment about $450,000.

Plans are being prepared by the South Buffalo Terminals, Inc., Iroquios Building, Buffalo, Edward C. Randall, president, for a one-story industrial building, 230 x 2200 ft., to be erected on Colgate and Reading streets and the South Buffalo Industrial Railroad. The initial unit will be 800 ft. in length and will cost $250,000.

The Rome Wire Co., Rome, N. Y., has let contract to the John W. Cowper Co., Buffalo, for additions, totaling 60,000 sq. ft. floor space, to its recently acquired plant, Clyde Avenue and the Lackawanna Railroad, Buffalo.

The Mystic Oil Burner Corporation, Buffalo, has been incorporated with a capitalization of $50,000 by Elmer E. Harris, 22 Maurice Street, and I. A. and T. W. Van Arsdale, 158 Harvard Place.

The American Radiator Co., Buffalo, will build a plant and warehouse addition at Rano Street and the Lackawanna Railroad to cost $60,000.

The Edward T. Danahy Co., Buffalo, will build a manufacturing and storage building, boiler house and freezer building at Babcock and Howard streets and the Erie Railroad.

The Herschell-Spillman Co., machinist and founder, North Tonawanda, N. Y., has had plans drawn for a factory addition, 63 x 150 ft., four stories, to be erected at an estimated cost of $200,000.

Fire, Jan. 29, at the plant of the Queen City Foundry, 391 Norfolk Avenue, Buffalo, caused a loss estimated at about $10,000, including equipment.

The Crosby Co., 183 Pratt Street, Buffalo, manufacturer of steel stampings, etc., has awarded a contract to the B. I. Crocker Co., Builders' Exchange, for an addition to cost $10,000.

The Cooper Brass Works, Inc., Ogdensburg, N. Y., is having plans drawn for a new plant to cost about $100,000. R. J. Donohue is an official of the company.

The Jewett Refrigerator Co., 27 Chandler Street, Buffalo, manufacturer of refrigerators, etc., has acquired a tract of property adjoining its works on Maple Avenue, Lackawanna, N. Y., and plans for a number of additions. The company is considering the removal of its Buffalo works to this location, concentrating manufacturing at this point.

The Taber Pump Co., 291 Elm Street, Buffalo, has increased its capital stock from $100,000 to $200,000.

The Wayland Specialty Co., Wayland, N. Y., has been incorporated in Delaware with capital stock of $250,000 by Claude S. Wemlett, Edward H. Perkins and Charles L. Clark to manufacture automobile motors and parts.

The H. H. Franklin Mfg. Co., South Geddes Street, Syracuse, N. Y., has awarded a contract to W. J. Burns, Bastable Building, for a new machine shop, in connection with a new warehouse, and estimated to cost about $500,000. The die-casting business of the company will be operated as a separate feature in the future and for this purpose an organization to be known as the Franklin Die-Casting Corporation has recently been formed. It is planned to establish a works apart from the automobile plant for this branch of the business.

The Central City Wheel Co., Syracuse, N. Y., has been incorporated with a capital stock of $25,000 by W. H. and S. LeR. Dietz and D. E. Lillis, to manufacture automobile wheels.

The Cortland Forge Co., Cortland, N. Y., has had plans prepared for a forge shop addition.

The American Tygard Engine, Inc., 504 Franklin Street, Buffalo, recently incorporated to manufacture a patented steam engine, is planning for the establishment of a local plant to develop a capacity of about 100 engines a month.

The W. A. Wilson Machine Co., 217 North Water Street, Rochester, N. Y., has filed notice of dissolution.

The Baldwin Cutlery Co., Tidioute, Pa., has had plans prepared for a new two-story and basement plant, 45 x 66 ft., on Market Street, Jamestown, N. Y., to cost about $30,000. H. D. Baldwin is president.

The King Electric Mfg. Co., Tonawanda, N. Y., has been incorporated with a capital stock of $25,000 by L. Smith, 41 Christiana Street, North Tonawanda; P. Kisler, 81 Sterling Avenue, Buffalo; and V. F. King, 48 Main Street, Tonawanda, to manufacture electrical specialties.

The Buffalo Pressed Steel Co., 800 Kensington Avenue, Buffalo, has increased its capital stock from $1,000,000 to $1,125,000.

The Jamestown Metal Desk Co., Wellman Building, Jamestown, N. Y., has awarded a contract to Shellburg & Linquist, 35 Bush Street, for a one-story plant, 80 x 220 ft., on Blackstone Avenue, to cost $50,000.

The Continental Heater Co., Dunkirk, N. Y., has completed plans for a one-story foundry, 64 x 175 ft., on Otter Street, to cost $25,000.

The Endicott Forging & Mfg. Co., Endicott, N. Y., is planning for an addition. It has installed the following new equipment: One 1600-lb. Chambersburg board drop hammer; one 1800-lb. Chambersburg board drop hammer; one 4000-lb. Chambersburg board drop hammer; one billet shear; one Ferracute trimming press; two No. 2 Chambersburg trimming presses; one 36-in. boring mill and one Sturdevant blower. Necessary motors and equipment for individual drive were also purchased.

Baltimore

BALTIMORE, Feb. 9.

The Precision Grinding Wheel Co., 101 East Lexington Street, Baltimore, has been incorporated by Joseph P. Murray, Frank S. Muzzey and F. Stanley Saurman to manufacture abrasive materials, grinding wheels, etc.

The Arundel Sand & Gravel Co., Fidelity Building, Baltimore, will build a one-story iron conveyor at Brooklyn, Baltimore, to cost $6,000.

The Continental Engineering & Equipment Co., 1119 Fidelity Building, Baltimore, has been incorporated to manufacture iron, steel, brass and other products, to erect power plants, heating plants, plumbing and fire protection equipment, etc. The incorporators are Harry E. Karr, R. Bennett Darnall and Edward M. Hammond.

The Seamless Hollow Ball Co., Baltimore, has increased its stock from 1500 to 3000 shares.

Merin Brothers, 1024 East Baltimore Street, Baltimore, will build a garage and repair shop at 1504-8 Guilford Avenue, 50 x 72 ft., to cost $10,000.

The Baltimore Valve Co., Sinclair Lane near Belair Road, Baltimore, will establish a machine shop and foundry.

In connection with the construction of a plant at Curtis Bay, Baltimore, by the Piedmont-Mt. Airey Guano Co., the factory will cost about $225,000 and machinery $250,000. E. W. Levering, Calvert Building, Baltimore, is president.

Additions to be built by the J. C. Eichman Mfg. Co., Bush and Wicomico streets, Baltimore, manufacturer of plumbers' supplies, include a foundry, 40 x 40 ft.

The Universal Electric Furnace Co., 1520 Fidelity Building, Baltimore, has been organized with $150,000 capital stock to manufacture electric brass-melting furnaces. Raymond M. Glacken is vice-president.

The Universal Mfg. Co., Riverdale, Md., has been incorporated with $1,000,000 capital stock to manufacture a graphophone manufactured in accordance with inventions of Arthur Laurencich. The incorporators are Mr. Laurencich, Louis H. Schmidt and Edgar T. Brandenburg.

The Carolina Automatic Machinery Co., Durham, N. C., has been incorporated with $25,000 capital stock by J. S., A. H. and W. F. Carr to manufacture patented machinery.

Prices on new and second-hand cupolas are wanted by the Davis Foundry & Machine Works, Rome, Ga.

Cranes, boiler-shop equipment and other machinery will be installed by the Sistersville Tank & Boiler Works, Sistersville, W. Va., at its new plant, to cost about $30,000. Charles Helfrich is manager.

The Chesapeake Iron Works, Westport, Md., is taking bids for a one-story shop addition, 58 x 210 ft., to cost $50,000.

The Lilliston Harvester Co., Albany, Ga., has been incorporated with a capital stock of $200,000 by J. H. Lilliston.

Suffolk, Va.; C. J. Rambo and J. M. Webb, Edison, Ga., to manufacture harvesting equipment. It plans the immediate establishment of a plant to comprise machine shop and foundry. Later the works will be extended for the manufacture of gasoline engines, etc.

The Walker Machine & Foundry Co., Roanoke, Va., has been incorporated with a capital stock of $25,000 by Charles M. Walker and J. W. J. Goff.

Pittsburgh

PITTSBURGH, Feb. 9.

The Chamber of Commerce, Pittsburgh, has compiled statisics showing a total of 2444 industrial plants operating in this district, with a capital investment of $884,659,700, an increase of about 25 per cent as compared with the years prior to the war. The industrial output of the city is estimated at more than $2,305,065,000 yearly, and the different plants have increased production about 400 per cent between the years 1914 and 1918. The average daily payroll in the industrial district is now more than $2,500,000.

The Pittsburgh Valve Foundry & Construction Co., Twenty-sixth Street and Allegheny Valley Railroad, Pittsburgh, will build a one and one-half-story addition, 27 x 84 ft., to cost $70,000.

Fire, Jan. 29, destroyed a portion of the works of the Automobile Metal Body Mfg. Co., 346-50 Collins Avenue, Pittsburgh, with loss estimated at $10,000.

The Cabinet Fixtures Co., Pittsburgh, has acquired two factories on property 60 x 140 ft. at 2025-29 Chateau Street for a new works.

The Bessemer Gas Engine Co., Grove City, Pa., has acquired a block of 16 adjoining properties and has plans under way for a foundry and pattern shop to cost $250,000, including equipment. The buildings will be located at Madison and Lincoln avenues. A housing development will also be inaugurated in the spring, covering the erection of 50 dwellings for employees.

The Allegheny Steel Tank Car Co., Warren, Pa., is planning for increased capacity at the works of the Allegheny Tank Car Co., recently taken over. It is said the output will be more than doubled.

The American Castings Co., Corry, Pa., has been incorporated with a capital stock of $50,000 by S. V. Stewart and associates.

The Mead-Tolliver Coal Co., Killarney, W. Va., is planning the rebuilding of its machine shops, recently destroyed by fire, with loss estimated at $25,000.

The Virginia Rubber Co., Union Trust Building, Charleston, W. Va., has commenced the construction of a two-story and basement plant, 118 x 180 ft., for the manufacture of automobile tires. With power plant for works service, the new plant will cost about $100,000. E. T. Baird is president.

The Tirometer Valve Corporation of America, Charleston, W. Va., recently organized, is considering plans for a plant. S. A. Moore is secretary and treasurer.

The United States Zinc Corporation, Moundsville, W. Va., is planning for additions, including the establishment of a zinc smelting plant.

The Wheeling Machine Products Co., Warwood, W. Va., recently organized, is planning a new plant, 50 x 100 ft., to be equipped for the manufacture of screw-machine products, bushings, studs, etc. Albert L. Doepken is president, and E. W. Krause, general manager.

The West Virginia Metal Products Co., Schmulbach Building, Wheeling, W. Va., has inaugurated construction work on its new plant at Fairmont, W. Va., for the manufacture of brass and copper products. The mills will be equipped to develop a daily capacity in excess of 50,000 lb. of finished rods, plates, tubes, wire, etc. The plant is estimated to cost close to $1,000,000. J. E. Watson is president; and Louis J. Krom, works manager.

F. G. Friedrich, John Salato, Reuben Smith, C. D. Winkelman and Anthony Bonosorio have formed the Adams Foundry & Machine Co., Youngstown, Ohio, with a capital stock of $100,000, to manufacture a non-skid wheel device. A machine shop will be built this summer.

The Domestic Utility Mfg. Co., Clarksburg, W. Va., has been incorporated with a capital of $10,000 to manufacture castings, tools, fixtures and machinery. J. T. Gibbons, J. J. Williams and James N. Thomas are named as incorporators.

The General Rock Products Co., which operates limestone and dolomite quarries in York, Pa., and which plans to do a general business in foundry sands, burnt lime and foundry equipment, has opened an office in room 628 Oliver Building, Pittsburgh. Paul B. Reinhold, formerly in the sales department of the Crucible Steel Co. of America, Pittsburgh, is president of the company.

Chicago

CHICAGO, Feb. 9.

While the recent advances hastened the closing of much pending business, some dealers note a decline in new inquiries and believe that buyers are becoming discouraged by deliveries, which are now rarely better than four or five months, and in many instances much worse. In other quarters the opinion is voiced that labor difficulties and shortage of raw material have tended to inhibit further purchases of shop equipment. The labor situation, in fact, is cited as one reason for the activity in cranes in recent months. Sales of one, two and three cranes have been numerous and in some cases large orders have been booked, the Samson Tractor Works alone having purchased 11 electric traveling cranes.

If we are entering a period of slackened activity in the machinery market, it is believed that tool manufacturers will welcome the opportunity to catch up on their commitments. Few observers, however, anticipate that a lull in buying could last for more than a few months, as the railroads are expected to be forced to purchase at least a substantial portion of their long deferred needs, and numerous industrial plants, now in the course of construction, will be compelled to buy equipment regardless of market conditions. To what extent the delivery situation will lead to increased purchases of Government tools is open to conjecture, as the sales from the United States warehouse in this city to date have not interfered noticeably with the business of local dealers.

A notable order for a single machine was the recent purchase by the Miehle Printing Press & Mfg. Co. of a 96-in. x 72-in. x 25-ft. planing machine. The Illinois Steel Co. has bought a large coach wheel lathe and is in the market for several heavy duty drilling machines.

Building construction in Chicago in January showed marked improvement over the corresponding month a year ago. Permits were taken out for 328 structures, involving a total cost of $7,682,000, as against 99 buildings, costing $1,630,000, authorized in the first month of 1919.

The LaSalle Steel Co., 2243 South Halsted Street, Chicago, has purchased 31 acres on the north side of Hammond, Ind., lying between 150th Street and the Indiana Harbor Belt Railroad, on which it will construct a plant in three units, which will have a total floor space of 800,000 sq. ft.

The Acme Steel Goods Co., 2834 Archer Avenue, Chicago, has closed contracts for the construction of another mill building at its Riverdale plant. It will be 150 x 600 ft. and will be equipped with 20 10-in. cold-roll mills, together with necessary annealing ovens, slitters and finishing machinery.

The Reliable Electric Co., 411 South Sangamon Street, Chicago, will erect a one-story plant to cost $85,000 in Carroll Avenue, east of Kedzie Avenue.

The Elgin National Watch Co., Elgin, Ill., is having plans prepared by Postle & Fisher, Chicago, for several four-story buildings to be erected at the Elgin plant, at an estimated cost of $1,000,000.

The Concrete Steel Co., 3209 West Thirtieth Street, Chicago, has had plans prepared by Lockwood, Greene & Co. for an additional plant to be erected at West Thirty-first Street and Central Park Avenue. It will be 80 x 100 ft., one story, and will cost $20,000.

The Playerphone Talking Machine Co., 338 North Kedzie Avenue, Chicago, has awarded the contract for a second addition, to be erected adjacent to the plant now under construction at 4223-37 West Lake Street. It will be four stories, 81 x 110 ft., and will cost $100,000.

Jacob Dexheimer, 310 West Jackson Boulevard, Chicago, will receive bids on a one-story garage and repair shop 110 x 150 ft., to be erected for his own use in North Halsted Street, near Addison Street, at a cost of $30,000.

The Pullman Co., Pullman, Ill., is constructing a new three-story plant with 300,000 sq. ft. of floor space and a press building, 80 x 200 ft. It is also remodeling its foundry buildings to furnish 190,000 sq. ft. of additional space. The improvements are to take care of the manufacture of automobile bodies, and with equipment will cost about $3,500,000.

The General Combustion Co., Monadnock Building, Chicago, has purchased a tract of land in the northwest side of Chicago, and has awarded a contract for the erection of the first unit of a new plant. This building, which will provide 10,000 sq. ft. of floor space, will be used for storage purposes. Machine shops, fabricating shops and a general office building will be erected later.

The Rock Island Register Co., Rock Island, Ill., will build a $75,000 plant.

The Rock Island Mfg. Co., Rock Island, Ill., is building a foundry addition, 80 x 120 ft., to cost $25,000.

The Champion Auto Equipment Co., George Kroerzer, president, Hammond, Ind., will construct two one-story plant units, 100 x 350 ft. each, to cost $150,000.

The Midway Foundry Co., 2329 University Avenue, St. Paul, Minn., will build a foundry, 50 x 100 ft., to cost $15,000.

The Standard Oil Co., Mankato, Minn., will construct a paint and machine shop at a cost of $150,000.

The Independent Truck Co., Davenport, Iowa, will erect a two-story addition to cost $20,000.

The Trefrey Motor Co., Topeka, Kan., plans to construct a five-story garage, 75 x 100 ft., to cost $100,000.

The Johnson Fare Box Co., 236 South Robey Street, Chicago, manufacturer of metal coin boxes, is taking bids for a three-story plant, 120 x 165 ft., on East Ravenswood Street, to cost about $100,000. W. P. Butler is president.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, is having plans prepared for a new electric generating plant at Calumet, Ill., near Chicago, to cost in excess of $750,000, including equipment.

The Isko Co., 111 West Washington Street, Chicago, manufacturer of ice machinery, has increased its capital stock from $7,125,000 to $26,000,000.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Street, Chicago, is taking bids for a one-story top addition to its plant, 47 x 124 ft., to cost about $20,000.

The Kewanee Boiler Co., Kewanee, Ill., has awarded contracts to the Lackawanna Bridge Co., Buffalo, for the construction of a number of additions to its plant on the 10-acre site adjoining the works, recently acquired. The new buildings will average one story, about 80 ft. wide, with aggregate length of 1750 ft., and will occupy over three acres. They will be used for extensions to the main boiler manufacturing shops, foundry and other buildings and will increase the capacity close to 50 per cent. More than 300 additional men will be employed. It is expected to have the buildings ready for occupancy during the summer. The company recently purchased property, 100 x 100 ft., at Washington and Green streets, Chicago, and will erect a four-story and basement office building.

Daniel F. Quinlan, Woodstock, Ill., has organized a company to manufacture iron castings and machine products. Plans have been prepared for a one-story foundry, 85 x 200 ft., to cost about $75,000, with equipment.

Cincinnati

CINCINNATI, Feb. 9.

The principal feature the past week in the machine tool industry has been the number of advances made in machine tool prices. Owing to the increased cost of labor and raw materials almost all manufacturers have been compelled to advance prices and one lathe maker, who announced an increase on Jan. 1, was forced to make a 10 to 14 per cent advance on Feb. 1.

The Franklin Tractor Co. has purchased several tools for its new plant now under construction at Greenville, Ohio; the Dodge Motor Co., has placed orders for several planers; the McLeod Co., a local concern, has purchased several tools for its new plant, and orders for additional equipment, mostly single machines, have been received from several motor companies operating in Detroit.

Part of the order for $700,000 worth of tools reported to have been sold to Spanish and Portuguese interests some weeks ago, and which later developed a hitch, has been placed, but the major part of this business is still under negotiation.

The Tri-State Machine Works, Memphis, Tenn., recently reorganized, purchased a number of tools the past week, including several lathes and one planer. It is understood the company contemplates the erection of a new plant in the near future.

The Sebastian Lathe Co., Covington, Ky., has taken out a permit for an addition to its plant to cost $7000. Construction will start shortly.

The Dayton Body & Cabinet Co., Dayton, Ohio, has been incorporated with a capital stock of $50,000 to build automobile bodies and do a general wood-working business. C. C. Breech, D. L. Waggoner and V. B. DeVall are among the incorporators.

The Fischer Special Machinery Co., Cincinnati, has purchased property in the Walnut Hills section for a consideration said to be in the neighborhood of $30,000. While no definite plans for the future have been decided upon, it is understood the company has in contemplation the erection of a new plant.

The McLeod Co., Bogen Street, Cincinnati, is receiving estimates through Stewart & Stewart, architects, for the erection of two buildings, each three stories, 28 x 80 ft. and 58 x 100 ft. respectively. Construction will commence in the spring. It recently purchased additional equipment for its new plant, but is in the market for sheet-metal working machinery and radial drills, also for a 5-ton electric crane.

The Buckeye Drill & Lathe Co., Columbus, Ohio, has been incorporated with a capital stock of $300,000. W. N. Hoppe, O. H. Gray, E. F. Westerhold, W. C. Way and Leonard Dudley are the incorporators.

The Hocking Valley Mine Supply Co., Athens, Ohio, recently incorporated, has leased the machine and blacksmith shop of the Athens Brick Co., and is installing machinery for building mine cars and doing general machine and repair work. James Rustin is president.

As the first step towards establishing a transportation and storage depot in Cincinnati it is proposed to build a two-story garage on East Third Street. It will be 80 x 100 ft. and will have accommodations for 60 cars and trucks. Peter Hughes, who is interested in a transportation route between Cincinnati and Dayton, will be the proprietor.

The Randle Mfg. Co., Cincinnati, has begun the erection of a two-story brick factory and office building adjoining its property on Elmore Street. It manufactures brass goods, and when the new building is completed will move the foundry from its present location.

The Gordon Machine Co., Cincinnati, has purchased the plant and equipment of the Printing Machinery Co. It is understood that the machinery will be moved to its plant on Evans Street.

The Board of Trustees, Lebanon, Ohio, is having plans prepared by Chase & Wright, engineers, Union Central Building, Cincinnati, for a one-story municipal light and power plant to cost about $120,000, including equipment.

The J. A. Harps Mfg. Co., Greenfield, Ohio, manufacturer of tanks, cans, etc., is having plans prepared for a one-story addition, 100 x 200 ft., on South Fifth Street, to cost about $60,000. J. A. Harps is president.

The Estate Stove Co., Hamilton, Ohio, has increased its capital to $1,000,000 and is planning for enlargements.

The Burnett-Larsch Co., Monument Street, Dayton, Ohio, manufacturer of electric pumping machinery, is planning for the construction of a five-story, reinforced-concrete and brick addition, 60 x 180 ft., to cost about $150,000.

The Beecher-Fowler Mfg. Co., Louisville, Ky., manufacturer of stencils, stamps, etc., has increased its capital stock from $15,000 to $50,000.

Cleveland

CLEVELAND, Feb. 9.

The machinery market continues active, although no large orders were placed the past week and no large inquiries have come out. The General Motors Corporation is still buying machinery to round out the equipment in its various plants and among its late orders is one for eight screw machines placed with a local manufacturer. The Ford Tractor Co. is still buying some machinery. The Fisher Ohio Body Co. has placed a contract for its Cleveland plant, for which a large amount of machinery will be required. Some additional price advances have been made and a number of machine tool builders who have made no advances in the last few months are considering marking up prices because of the increased cost of material.

The Lake Erie Foundry Co., Painesville, Ohio, recently incorporated, has acquired the plant formerly occupied by the Vulcan Automotive Co. in that city and will manufacture gray iron and semi-steel castings, specializing on automobile work. The plant has a 34 and 36-in. cupola. L. H. de Forest is president and treasurer; F. M. Wyss, vice-president, and G. L. Beatty, general manager. The officers were formerly associated with the Aluminum Castings Co., Cleveland, and Mr. Beatty was superintendent of the company's Harvard Avenue plant.

The Duesenberg Automobile & Motor Corporation, Cleveland, has been incorporated with a capital stock of $15,000,000 and contemplates building a plant on 152d Street.

The Hercules Motor Mfg. Co., Canton, Ohio, has increased its capital stock from $800,000 to $1,500,000. No immediate plant extensions are contemplated

The Eclipse Electric Co., Canton, Ohio, has increased its capital stock from $10,000 to $50,000 to take care of the growth in its business, which has more than doubled the past year.

The Martin Steel Products Co., Mansfield, Ohio, will erect a new plant, 100 x 300 ft. It manufactures steel garages and corn cribs.

The Brown Clutch Co., Sandusky, Ohio, will enlarge its plant by the erection of one building, 30 x 64 ft., and another, 100 x 128 ft., doubling its present capacity. They will be equipped with a 5-ton traveling crane, molding machines and air compressors.

Detroit

DETROIT, Feb. 9.

The Detroit Printers' Roller Works, 45 West Fort Street, Detroit, will build a one-story addition, 28 x 70 ft., on Leach Street, near Brooklyn Avenue.

The S. Gier Pressed Steel Co., the Prudden Co. and the Auto Wheel Co., all of Lansing, Mich, and the Weis & Lesh Mfg. Co., Memphis and Jackson, Tenn., have been merged into a company to be known as the Motor Wheel Corporation. It has a capital stock of $10,000,000 and will manufacture automobile wheels.

The American Electrical Heater Co., Woodward and Burroughs streets, Detroit, manufacturer of electrical heating devices, will build two one-story additions, 60 x 417 ft., and 23 x 32 ft., on Commercial and Dequindre streets, to cost about $35,000. The first structure will be used for general manufacturing and boiler plant service, and the other for assembling work.

The Jackson Screw Products Co., East Washington Avenue, Jackson, Mich, is taking bids for a one-story addition, 50 x 120 ft.

The Handley-Knight Co., Kalamazoo, Mich., recently organized with a capital stock of $1,000,000, will specialize in a four-cylinder motor car, with manufacturing plant in this section. J. D. Handley heads the company.

The H. P. Co., Midland, Mich., manufacturer of mechanical products, is considering the erection of a one-story machine shop, 60 x 150 ft., to cost about $50,000. Carl C. House is manager.

The Cadillac Metal Parts Co., Cadillac, Mich., manufacturer of automotive accessories, has been given a block of land by the city and building materials are being assembled for a plant.

Operations have begun in the brass and aluminum foundry recently constructed in Rochester, Mich., by the Rochester Foundry & Machine Co. It is hoped by April 1 to have completed the iron foundry now in course of erection. The company is capitalized at $30,000.

The Detroit Weatherproof Body Co. will erect several new units at its plant in Corruna, Mich., and make other improvements and alterations. The company's main plant is at Pontiac, Mich.

The Jacquet Motors Corporation of America, which has been organized with a capitalization of $100,000, and is headed by Alfred J. Jackson, Battle Creek, Mich., will buy the former branch plant of the Grand Rapids Brass Co., Belding, Mich., for the manufacture of a high-priced motor car designed by Mr. Jackson. L. W. Wilson, superintendent of the Timkin-Detroit Axle Co., will be superintendent of the Belding plant.

The Ewing Bolt & Screw Co., whose formation was recently mentioned, will build a plant in Detroit with about 25,000 sq. ft. of floor space for the manufacture of screws, bolts, nuts, rivets and kindred articles. A site is now under negotiation. Several Cleveland and Detroit men are interested in the company. Myles E. Ewing, formerly secretary of the Falls Rivet Co., Kent, Ohio, is president; David L. Rockwell, vice-president; H. J. Douglas, treasurer, and Francis R. Marvin, secretary. The officers with the exception of Mr. Ewing are Cleveland men.

Milwaukee

MILWAUKEE, Feb. 9.

The machine tool business continues in increasing volume. Bookings the first week of February were of large proportions, despite the fact that orders consist principally of single tool or small lots. The automotive industries are placing a lot of business, especially in milling machines. Manufacturers are complaining of the unfavorable railroad traffic situation, the car shortage and slow movement of freight, being said to be the worst on record.

The Gardner Machine Co., Beloit, Wis., manufacturer of disk grinders and other tools, will erect a two-story addition, 100 x 250 ft., involving a total investment of $150,000 in building and equipment. L. Waldo Thompson is president and general manager.

The McDonough Mfg. Co. of Eau Claire, Wis., has been reorganized following the transfer of the controlling interest to new capital. The capital stock is being increased from $150,000 to $300,000 to finance extensions and the general improvement of the plant. J. A. McLennan, who has been general superintendent of the Link Belt Co. works at Philadelphia, assumes the general management of the McDonough company, effective Feb. 16. The concern was incorporated in 1888 to manufacture sawmill machinery, and more recently has engaged in the production of machine tools, specializing in the Daniels automatic multiple spindle chucking machine, the Sterling cylindrical grinder and Sterling tool grinder. The manufacture of sawmill equipment will be continued, however. The new officers are: President, S. G. Moon; vice-president, R. B. Gillette; secretary, S. R. Davis; treasurer, D. R. Moon; directors, F. McDonough, A. E. Peirce, C. D. Moon and P. M. Beach.

The Kewaunee Machine Co. of Kewaunee, Wis., has been organized by Carl Hartmann of Green Bay, Wis., to take over and continue the operation of the Marvel Motor Works, which has been inactive for some time. The new owner will conduct a commercial machine shop and do general repair work.

The Progressive Tool Mfg. Co., Beloit, Wis., has increased its capital stock from $5,000 to $25,000.

The Duncan Mfg. Co., Freeport, Ill., is negotiating for the lease or purchase of the Peter Jacobs factory building at Kenosha, Wis., with a view of equipping it for the manufacture of incubators, food hoppers and other specialties. The company is capitalized at $300,000. A. M. Duncan is president.

The Standard Body Co., Appleton, Wis., has been organized by L. C., E. C., G. H. and R. O. Schmidt to manufacture automobile bodies, truck cabs and similar goods. A plant is being equipped. The capital stock is $30,000.

The Harley-Davidson Motor Co., Milwaukee, is purchasing considerable equipment for a six-story addition to be ready for occupancy about April 1, and providing 150,000 sq. ft. of additional floor space. The total area of the plant is 600,000 sq. ft. William S. Harley is chief engineer.

The Schwab-Lezott Co., Milwaukee, manufacturer of boilers and tanks, has let contracts for the construction of a one-story brick and concrete boiler shop addition, 60 x 205 ft., at Sixteenth and Canal streets, estimated to cost $50,000.

The Jenkins Machine Co., Sheboygan, Wis., will build a one-story addition, 40 x 80 ft., and otherwise remodel and improve its plant. A. G. Studeman is general manager.

The Kenosha Wheel & Axle Co., Kenosha, Wis., manufacturer of steel wheels and rear axles, is in the market for considerable new equipment to bring its production for 1920 to 10,000 axles. James Whitcomb is president.

The T. L. Smith Co., Milwaukee, is awarding contracts for the erection of three shop additions, 49 x 271 ft., 73 x 90 ft., and 30 x 58 ft., at Thirty-second and Hadley streets. It manufactures concrete mixers, paving equipment, etc. The capital stock recently was increased from $800,000 to $1,250,000.

The Roberts Brass Co., 249-251 Lake Street, Milwaukee, is erecting a two-story brick addition, 60 x 75 ft., to its No. 2 foundry at Alexandra and Lincoln avenues, which with equipment will cost about $35,000.

The Fox Ice Co., Racine, Wis., will build an artificial ice plant with a daily capacity of 50 tons. It has increased its capital stock from $50,000 to $125,000 to finance the construciton and equipment of the plant.

The Auotmotive Electric Service Co. of Madison, Wis., has been incorporated with a capital stock of $20,000 by A. X. Merz, R. J. Nickles and T. T. Coleman, who are affiliated with the Madison-Kipp Corporation. A four-story service station and machine shop, 60 x 250 ft., will be erected at West Main and South Fairchild streets.

The Milwaukee Tank Works, Milwaukee, has broken ground for a one-story boiler shop, 100 x 200 ft., and a one-story auxiliary building, 90 x 100 ft., which will cost about $75,000, including additional equipment to be purchased. The work is in charge of the Northwestern Bridge & Iron Co.

The Milwaukee Printers Roller Co., 368 Milwaukee Street, Milwaukee, will build a three-story addition, 60 x 100 ft., to its main plant at Greenbush and Virginia streets. Wallace P. Allen is vice-president.

The Badger Metal Ware Co., Milwaukee, has been incorporated with a captial stock of $200,000 to manufacture sheet metal products, wash boilers, etc. The incorporators are Harry R. Kuntz, Louis S. Wiener and F. A. Landeck, attorney, 425 East Water Street.

The Latex Tire Co., Fond du Lac, Wis., has increased its capital stock from $100,000 to $500,000 A new plant is being completed and will go into full operation March 1. A duplicate unit, 50 x 200 ft., two stories, will be erected during the spring and summer. F. S. Danenberg is president and general manager.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has awarded the general contract to Walter W. Oeflein, Inc., Milwaukee, for erecting a three-story brick and steel addition, 40 x 135 ft., to its No. 4 plant at Two Rivers, Wis.

Catalogs Wanted

The W. H. Hobbs Supply Co., Eau Claire, Wis., jobber of mill supplies, plumbing and heavy hardware, has com-

pleted its new five-story building and will add a line of builders' shelf and general hardware. It desires manufacturers' catalogs.

Texas

AUSTIN, Feb. 7.

W. H. Irvin, Houston, plans to spend $500,000 in additions and improvements to his ice and ice cream manufacturing plants in that city. A cold storage plant will also be built.

The West Texas Face & Common Brick Co., Wichita Falls, has been incorporated with a capital stock of $150.000 and will build a plant. The incorporators are J. H. Boring and B. Counselman, Wichita Falls, and E. M. Raub, Chicago.

G. A. Humason, Houston, contemplates building a plant at Dallas or Wichita Falls for the manufacture of an oil well pump of his own invention.

The Lone Star Ice & Fuel Co., Fort Worth, has been incorporated with a capital stock of $60,000. The incorporators are J. R. Foster, J. D. Little and J. S. Greins.

The Mont Belvieu Iron Works has been incorporated at Mont Belvieu with a capital stock of $10,000. A. M. Bullard is a stockholder.

The Industrial Gin Co., Texarkana, will build a cotton gin to cost $10,000. W. S. Chance is interested.

St. Louis

ST. LOUIS, Feb. 9.

The Arkansas Brick & Lumber Co., Jonesboro, Ark., C. W. Culberhouse, president, is reported in the market for equipment for a brick plant and a planing mill.

W. G. and M. F. McWilliams, Skene, Miss., will install four gin stands, one 75-hp. oil engine and other machinery.

The Bellville Cotton Oil Co., Bellville, Ark., is in the market for about $30,000 worth of additional cotton oil machinery.

The Bristow Machine & Boiler Co., Bristow, Okla., is reported in the market for about $50,000 worth of machinery.

The American Oil & Refining Co., 210 Milam Street, Shreveport, La., capital stock $600,000, is in the market for equipment for the first 1000 bbl. unit of the plant.

The Simms Petroleum Co., Equitable Building, New York, will equip about 300 miles of pipe line with pumps, etc., at intervals of 40 miles from the Homer field to New Orleans, La.

The Invader Oil & Refining Co., Muskogee, Okla., has increased its capital by $8,000,000 and will equip a refinery.

The Arkansas Hydro-electric Development Co., E. T. Stanfield, general manager, Boyle Building, Little Rock, Ark., will equip a plant with a first installation of 3000 hp. on Red River and ultimately increase the investment to about $5,500,000.

The Devol Ice Co., Devol, Okla., W. W. Houswright and others interested, will purchase about $30,000 worth of equipment.

The American Hinge Co., Muskogee, Okla., J. T. Nichols president, will equip a plant to manufacture its product, which has heretofore been made under contracts.

The Auto Chain Pull Co., Oklahoma City, Okla., W. B. Smalling and others interested, will equip a plant to cost about $200,000 for the manufacture of automobile chains.

The Dorris Motors Corporation, St. Louis, has been incorporated with $3,000,000 capital to take over the plants of the Dorris Motor Car Co. and the Astra Motors Corporation. It will remodel and extend the facilities for the production of 3000 passenger cars and 1000 trucks the present year.

Boudreau & Loeb, Morgan City, La., have about completed the organization of a company to manufacture a patented resilient automobile wheel, and are now erecting an assembling plant. They are open for quotations on pressed or malleable hubs, pressed or rolled rims, and spiral coiled springs.

The Christopher Rehkoph Boiler & Tank Works, Memphis, Tenn., has been organized by Christopher Rehkoph, Jr., and W. W. Foley to establish a local plant for the manufacture of boilers, tanks and other plate work.

The Berg Safety Crank Co., Little Rock, Ark., has increased its capital stock from $25,000 to $60,000.

The Clarksdale Machinery Co., Clarksdale, Miss., has completed plans for the erection of a one-story machine shop, 100 x 162 ft. J. H. Hooks is president and manager.

The Cochran Machine Tool Co., Memphis, Tenn., has been incorporated with a capital stock of $10,000 by C. W. Cochran, A. F. Roebuck and G. S. Lovell, to manufacture machinery and tools.

The E. B. Hartwell Tool & Handle Co., St. Louis, has been incorporated in Delaware with capital of $100,000 by E. B. Hartwell, Albert Blank and Frank G. Helgoth, to manufacture tools, machine parts, etc.

The General Machine & Equipment Co., St. Louis, has increased its capital from $2,000,000 to $6,000,000.

The Love Automatic Sprinkler Co., Scimitar Building, Memphis, Tenn., is considering plans for the construction of a new plant. C. C. Love heads the company.

The Curtis Motor Car Co., Urquhart Building, Little Rock, Ark., is considering plans for the erection of a new plant for the manufacture of automobiles, which, with equipment, is estimated to cost about $500,000.

The Tri-City Steel Co., St. Louis, has increased its capital stock from $1,000,000 to $2,000,000.

The Pacific Northwest

SEATTLE, Feb. 3.

The demand for machinery, both new and second hand, continues heavy. Deliveries are still far behind with no immediate hope for improvement. The car shortage continues acute and lumber manufacturers are greatly hampered.

The Ne Page-McKenna Co., Seattle, electrical engineer and contractor, plans the construction of a two-story factory, 145 x 122 ft., for use as a foundry, machine and general work shop.

The Western Paper Goods Co., Seattle, will erect a new factory, 90 x 103 ft., two stories, to cost $15,000, exclusive of the equipment.

The Moran Mfg. Co., Seattle, manufacturer of pumps, will build a two-story heavy timbered addition, 60 x 120 ft., to its plant.

The Olympia Foundry Co., Olympia, has been incorporated by W. L. Phillips, William Allard and others, for the establishment of a plant to manufacture gray iron castings. Later it will be equipped to manufacture brass castings.

Chris Kuppler & Sons, Seattle and Port Angeles, have been awarded contract for the erection of a paper mill at Port Angeles for the Washington Pulp & Paper Corporation, which will cost $200,000, exclusive of equipment.

The Klamath Warehouse & Forwarding Co., Klamath Falls, Ore., will double the capacity of its ice manufacturing plant at a cost of more than $10,000.

J. P. Van Orsdel and associates, Albany, Ore., have purchased the sawmill and timber holdings of the Albany Lumber Co. The new owners will immediately enlarge the plant and install additional machinery.

California

SAN FRANCISCO, Feb. 3.

The demand for machinery in nearly all sections of the State is good, and dealers are looking forward to an active call in the near future for the larger and standard machine tools.

The Acme Gas Engine Co. has taken over the adjoining shop, adding 25 per cent to its floor space. Some new machinery will be installed, but the space will be utilized mostly for a rearrangement of the shop plan.

The Simplex Ice Machine Co., Oakland, will build a factory at a cost of $200,000 before June 1. Fred Staude is president.

The American Can Co., Santa Fe Avenue, Los Angeles, will build a reinforced-concrete addition to its plant to cost about $100,000.

The Architectural Iron Works, Los Angeles, has been incorporated with a capital stock of $20,000 by William P. Redmond, Samuel Yens and Harry Friedman, 420 South Indiana Street, to manufacture structural and ornamental iron products.

The Holton Interurban Power Co., Riverside, Cal., has arranged an appropriation of $1,500,000 for extensions and improvements in its power plants and systems, including the erection of a number of hydroelectric power plants in the Imperial Valley districts.

The Globe Tool & Mfg. Co., 2605 Stephenson Avenue, Los Angeles, has been organized to manufacture machinery and tools. Fred Attula and Albert Check, 1211 Ingraham Avenue, head the company.

The American Rubber Co., Emeryville, near Oakland,

Cal., is contemplating the erection of a new two-story plant on Park Avenue, including a power house, to cost about $100,000.

The Dunsmore & Childs Co., Los Angeles, has been incorporated with a capital stock of $25,000 by George W. Adams, L. B. and J. R. Binford, to manufacture machinery and parts.

A machine shop and mechanical department will be installed in the manual training school to be erected by the Kern County Union High School District. Bonds for $200,000 for the erection of the structure have been voted.

The Los Angeles Valveless Pump Co., 316 East Third Street, Los Angeles, has filed notice of organization to manufacture pumping equipment. Frank F. Ambrose heads the company.

The Standard Oil Co., Los Angeles, is planning for the construction of additions to its refinery at El Segundo, Cal., which, with improvements in present buildings, will cost in excess of $1,000,000.

The Dwyer Mfg. Co., Los Angeles, has been incorporated with a capital stock of $50,000 by C. Marville and M. A. Dwyer, and R. M. Gilson, to manufacture automobile parts and accessory equipment.

The San Joaquin Light & Power Corporation, Fresno, Cal., is planning the construction of a one-story machine shop, 150 x 225 ft., on First Avenue. A section of the structure will be used for automobile and truck repair service.

The Pomona Mfg. Co., Pomona, Cal., manufacturer of castings, machinery, etc., is planning the erection of an addition to its foundry and pattern departments.

The Concrete Machinery & Supply Co., Los Angeles, has been incorporated with a capital of $100,000 by Ralph J. McFadden, L. N. Cleveland and O. C. Smith, to manufacture machinery.

Canada

TORONTO, Feb. 7.

Machine-tool dealers are experiencing a brisk demand for their goods. Inquiries received are from scattered sources and include mining concerns, railroads and municipal governments. The Canadian National Railways have issued a large list, mostly for milling cutters for its shops at St. Malo, Quebec. A large list is also looked for at an early date from the Grand Trunk Pacific Railway, which will shortly begin the erection of car shops at Edmonton, Alberta, at a cost of $3,000,000. Most of the business placed is for small orders, but these cover such a large range that dealers have to hustle to keep the supply up with the demand. Even with the increasing demand for rebuilt and second-hand equipment, which is selling in large quantities, they are far behind in deliveries on new equipment.

Major G. B. Johnson, Canadian Trade Commissioner, Caixa, P. O. Box 2164, Rio de Janeiro, Brazil, reports that the State-owned railroad of Brazil, known as A Estrada de Ferro de Carlos Barbosa a Alfredo Chaves, is in the market for machinery, rolling stock and supplies.

The Dominion Steel Products Co., Brantford, Ontario, will build a new foundry for the production of high-grade steel castings to cost approximately $150,000. It will adjoin the present plant and will be 100 x 160 ft. of brick and steel.

Joseph Samson, care of Samson & Filion, St. Paul Street, Limoilou, Quebec, has purchased a site and will build a factory for the manufacture of shovels, iron and steel products, etc.

Work will start immediately on alterations to a building at Niagara Falls, Ontario, for a machine shop to cost $12,000 for G. D. Wilson and Harry Sham, 122 Buchanan Street. New machinery will be installed.

The Mortimer Co., 259 Sparks Street, Ottawa, Ontario, is in the market for one 15-hp. direct current motor, 500 volt, compound wound, speed not more than 1200 r.p.m.

The Galt Brass Co., Galt, Ontario, has completed plans for the erection of an addition to its plant.

A company composed of American and Canadian capitalists, of which J. Gill Gardner, Brockville, Ontario, is president, will start work in the spring on the erection of a foundry at Brockville, Ontario, which will employ 125 when in operation.

The Smiths Falls Malleable Castings Co., Smiths Falls, Ontario, will shortly reopen its plant on the river front, which has been idle for the past five years.

The Kyle Malleable Works, Merrickville, Ontario, whose factory was completely gutted by fire and a large quantity of machinery destroyed, will rebuild immediately. It will be a more modern plant, housed in a one-story structure.

The Manitoba Bridge & Iron Works, Ltd., Winnipeg, is in the market for a 10-ton locomotive crane.

The Preston Woodworking Machinery Co., Ltd., Preston, Ontario, is in the market for a 24, 30 or 36-in. Bullard vertical turret lathe, or equal, with turret head and side head.

George Craddock & Co., Glasgow, Scotland, through their managing director for Western Canada, George C. Pettapiece, are negotiating for the purchase of 10 acres in Point Grey adjoining Vancouver, B. C., for the erection of a plant for the manufacture of wire rope, etc.

The Dominon Shipbuilding & Repair Co., Ltd., Toronto, has been incorporated with a capital stock of $3,000,000 by George M. Willoughby, Norman S. Robertson, 44 King Street West; Harold L. Steele, 437 Broadview Avenue.

The Universal Shoe Machinery of Canada, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by Howard S. Ross, Henry M. Gardner, both of Westmount, Quebec; Eugene R. Angers, George T. Porter and others of Montreal, to manufacture boot and shoe machinery, etc.

The Canadian Electric Steel, Ltd., Montreal, has been incorporated with a capital stock of $5,000,000 by William J. Shaughnessy, Chilion G. Heward, Herbert W. Shearer and others to manufacture iron and steel products, machinery, etc.

The Automatic Telephones and Time Recorders, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Henry H. Davis, room 25, 10 Adelaide Street East; John R. Rumball, 65 Charles Street West; James S. Beatty and others to manufacture automatic telephones, time recorders, tools, etc.

OFFICE CHANGES

The Tacony Steel Co., Philadelphia, is opening a Chicago sales office in the Marquette Building. Frank B. Hillwick, until recently with the Crucible Steel Co., is district sales manager. He was formerly with the Bethlehem Steel Co.

Lewis N. Luckens, jobber, Philadelphia, moved his office to his new warehouse, northeast corner of Nineteenth Street and Washington Avenue, on Feb. 1. The new telephone number is Dickinson 6856. The new arrangement gives more room and increased facilities, which include a Pennsylvania R. R. siding direct into the warehouse.

The office of Julius Blum & Co., New York, tubing, has been moved to 532-540 West Twenty-second Street, New York, where its warehouse is located.

Hyman-Michaels Co., Peoples Gas Building, Chicago, railroad equipment, recently opened up a temporary New York office, at 35 Nassau Street, room 1003, New York, which is the latest addition to offices in Chicago, Pittsburgh and St. Louis.

Colonial Stamping Co., Inc., has moved to its new plant at Brill Street (on Morris Canal), Newark, N. J. Modern equipment and increased facilities will enable it to enlarge its production of brass, steel, copper and aluminum products.

Henry Prentiss & Co., machine-tool dealers, Singer Building, New York, have opened a sales office at Hartford, Conn., in charge of L. P. Goodspeed, who has represented the Prentiss company in Connecticut for several years. Mr. Goodspeed is assisted by T. I. Shriver. The location of the new office is the Hartford Trust Building, 756 Main Street. This makes two offices for this firm in New England, the other being at Boston.

The S. & J. Tool Co., manufacturer of rivet sets, 2217 Chestnut Street, Philadelphia, has opened a sales office in New York in charge of J. W. Haig, Jr. Mr. Haig was formerly connected with W. & A. Fletcher Co., Hoboken, N. J. The office is at 110 Worth Street.

In addition to the district sales offices recently announced by the Booth Electric Furnace Co., it has opened a Detroit office in charge of M. A. Beltaire, Jr., at 805 Hammond Building, as well as an office at Birmingham, Ala., in charge of Gassman & Cunningham, Brown and Marx Building.

The Sherritt & Stoer Co. has opened new offices, storeroom and warehouse at 2006 and 2008 Market Street, Philadelphia, where it will maintain a permanent exhibition of machine tools, railway and machine shop equipment.

The Worcester Machine Co., Worcester, Mass., has been succeeded by Churchill-Morgan-Crittsinger, Inc.

W. T. Whitehead, Son & Co., 285 Beaver Hall Hill, Montreal, Quebec, has been taken over by Whitehead, Winans, Ltd.

BOOK REVIEWS

Foundry Cost Accounting. By Robert E. Belt. Pages 271, 5¾ x 8½ in.; many tables and blank forms. Published by the Penton Publishing Co., Cleveland.

The author is cost accountant for the American Malleable Castings Association, Cleveland. He says: "There are many industries that are peculiarly different and where it is difficult and sometimes impracticable to apply the conventional cost accounting principles and procedure. This is particularly true in the foundry industry." The author claims that with minor adaptations the principles, forms, classifications of accounts, methods of distributing overhead expense, procedure in determining the cost of individual jobs or classes of work, described in this book, can be used in a satisfactory manner by practically every foundry.

"The steel industry—rolled steel products—is in the foreground when it comes to improved accounting methods and business practices. Panics and depressions have given way to price stability. But the members of the allied industries are very lax when it comes to knowing what their product costs them to produce, and they are consequently suffering therefrom. It is entirely safe to say that not one-third of the jobbing foundries of the country know definitely where they are making money, if they are making it, or where they are losing money, if they are losing it."

The chapters deal with the following subjects: Importance of an accurate knowledge of costs, uniform cost finding methods and the effect on competition, examination of plant practices and operating conditions, installing and operating a cost system, accounting practice and records, operating departments and department records, classification and definition of accounts, monthly statements, product costs, depreciation, estimates and quotations, and profits.

"Electrical Operation of Gate Valves" is the subject of a booklet being distributed by the Cutler-Hammer Mfg. Co., Milwaukee. This is a reprint of an address given by Peter Payne Dean, before the Metropolitan Section of the American Society of Mechanical Engineers on the Dean system of electrical control of gate valves. This system is explained as consisting of an enclosed waterproof driving motor, reduction gears and limit trip mechanism combined into a single unit for the operation of the gate valve. The control of the valves is secured by one or more remote control stations. Some standard valves are described and it is explained how these may be equipped for power operation with remote control without removing the valve or putting it out of service. The article points out the desirability of having remotely controlled valves in power stations, waterworks, dry docks, refrigerating plants and oil refineries.

Bureau of Standards, Miscellaneous Publication No. 40, entitled "Annual Report of the Director for 1919," affords a review of the work of the U. S. Bureau of Standards for the year ended June 30, 1919. The report describes the functions of the bureau in connection with standards and standardization and contains a chart and description of the several classes of standards dealt with. The director also gives a clear idea of the relation of the bureau's work to the general public, to the industries and to the Government and includes a special statement of the military work of the year. Brief statements are made upon practically all of the special researches and lines of testing completed or under way. The list of these topics occupies 12 pages in the table of contents. The report comprises 293 pages.

"The coal consumption of power plants and bonuses for coal saving" is the subject of a 23 page booklet by Robert H. Parsons of Morgan and Partners, consulting engineers, London, England, and published by the *Electric Review*, Ltd., 4 Ludgate Hill, London, E.C.4. The booklet presents a graphic method for keeping a continuous check upon the efficiency of a boiler plant and provides a criterion by which the performance of the plant may be judged irrespective of the load it may carry. A scheme of bonuses for power plant employees according to the efficiency of their work is described.

A new publication of the Bureau of Standards, Technologic Paper No. 129, "Notes on the Graphitization of White Cast Iron Upon Annealing," is announced. The annealing or graphitization ranges of temperature were determined for three different compositions of white iron used for car wheels. The temperature of incipient graphitization was about 830 deg. for a 6-hr. anneal and about 730 deg. for a 48-hr. anneal. These temperatures were not appreciably affected by the variation of chemical composition of the samples investigated. Incidentally the results seem to indicate that graphite separates directly from solid solution.

An engineering journal is to be established by the undergraduates of the Massachusetts Institute of Technology. It will be called the *Tech Engineering News* and the plan is to publish articles of an engineering nature written by students and members of the faculty of the school, and also articles reprinted from the current numbers of engineering and trade journals. Hazen Pratt is editor, and the journal will be published at the Massachusetts Institute of Technology, Cambridge, Mass.

Increased demand from business men for copies of the booklet, "Trade Acceptances—What They Are and How They Are Used," by Robert H. Treman, formerly deputy governor of the Federal Reserve Bank of New York, and published by the American Acceptance Council, 111 Broadway, New York, is necessitating a new edition. This booklet is valuable not only for those who for the first time are seeking information as to the trade acceptance method but for those who have already adopted it in their respective lines of business. Another valuable pamphlet is the "A B C of the Trade Acceptance," which has been issued by Dr. J. T. Holdsworth, vice-president of the Bank of Pittsburgh, Pittsburgh.

A booklet with the title "To See Is To Understand" is being distributed by the Pangborn Corporation, Hagerstown, Md. It gives pictures of the executives and views of offices, various departments and shops used in the manufacture of sand blast and allied equipment. Views of sand blast installations in customers' plants are shown, and the story of the development of the company is given.

A reprint of a paper on "Cast-Iron Pipe or Welded Pipe for House Drainage," by Dr. William Paul Gerhard, published in the Journal of American Institute of Architects, June, 1919, is being distributed by the A. M. Byers Co., Pittsburgh. The article presents the results of investigations on the relative resistance to corrosion of steel and wrought-iron pipe.

A catalog of its bulletins has been issued by the National Safety Council, 168 North Michigan Avenue, Chicago. It is in stiff paper covering, 11x8½ in., 144 pages, and shows in miniature the scores of illustrated bulletins issued by it for the promotion of safety in all kinds of industrial and mercantile plants.

"Drinking Water, Wash and Locker Rooms, and Toilet Facilities," safe practices bulletin No. 27, has been issued by the National Safety Council, 168 North Michigan Avenue, Chicago. It illustrates and describes in 16 pages such practices for the elimination of accident hazards, as regards these phases of industrial life.

"Nitrate Number One" is the title of a booklet published by the J. G. White Engineering Corporation, 43 Exchange Place, New York. The text is supplemented by views of a nitrate plant built for the United States Government at Sheffield, Ala., by the White corporation.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	4.50c.
Swedish bars, base price	20.00c.
Soft Steel:	
¾ to 1⅞ in., round and square	3.52c. to 4.25c.
1 to 6 in. x ⅜ to 1 in.	3.52c. to 4.25c.
1 to 6 in. x ¼ to 5/16	3.62c. to 4.35c.
Rods—⅝ and 11/16	3.57c. to 4.05c.
Bands—1½ to 6 by 3/16 to No. 8	4.22c. to 5.25c.
Hoops	4.47c. to 5.50c.
Shapes:	
Beams and channels—3 to 15 in.	3.47c. to 4.25c.
Angles:	
3 in. x ¼ in. and larger	3.47c. to 4.25c.
3 in. x 3/16 in. and ⅛ in.	3.72c. to 4.60c.
1½ to 2½ in. x ⅛ in.	3.52c. to 4.40c.
1½ to 2¾ in. x 3/16 in. and thicker	3.47c. to 4.35c.
1 to 1¼ in. x 3/16 in.	3.52c. to 4.40c.
1 to 1¼ x ⅛ in.	3.57c. to 4.45c.
⅞ x ⅞ x ⅛ in.	3.62c. to 4.50c.
¾ x ⅛ in.	3.67c. to 4.55c.
⅝ x ⅛ in.	4.07c. to 5.35c.
½ x 3/32 in.	5.17c. to 6.05c.
Tees:	
1 x ⅛ in.	3.87c. to 4.75c.
1¼ in. x 1¼ x 3/16 in.	3.77c. to 4.65c.
1½ to 2½ x 3/16 in. and thicker	3.57c. to 4.45c.
3 in. and larger	3.52c. to 4.30c.

Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger	3.52c. to 4.25c.
Toe calk, ½ x ⅜ in. and larger	4.60c. to 4.85c.
Open-hearth spring steel	7.00c.
Standard cast steel, base price	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
¼ in. and heavier	3.67c. to 4.50c.

Sheets

Blue Annealed	Per lb.
No. 10	5.07c. to 6.25c.
No. 12	5.12c. to 6.30c.
No. 14	5.42c. to 6.35c.
No. 16	5.52c. to 6.45c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	6.80c. to 8.80c.	——
Nos. 22 and 24	6.85c. to 8.85c.	9.80c.
No. 26	6.90c. to 8.90c.	9.85c.
No. 28	7.00c. to 9.00c.	10.00c.
No. 30	7.10c. to 9.10c.	——

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per lb.
No. 14	7.25c. to 9.00c.
No. 16	7.50c. to 9.25c.
Nos. 18 and 20	7.65c. to 9.40c.
Nos. 22 and 24	7.80c. to 9.55c.
No. 26	7.95c. to 9.70c.
No. 27	8.10c. to 9.85c.
No. 28	8.25c. to 10.00c.
No. 30	8.75c. to 10.50c.

No. 28, 36 in. wide, 20c. higher.

Pipe

Standard—Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt...	—36	—19	¾-1½ in. Butt.	—18	+2
¾-3 in. Butt.	—40	—24	2 in. Lap.....	— 9	+9
3½-6 in. Lap.	—35	—20	2½-6 in. Lap..	—11	+6
7-12 in. Lap..	—25	— 8	7-12 in. Lap...	+ 2	+20

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per lb.
Bright basic	7.50c.
Annealed soft	7.50c.
Galvanized annealed	8.00c.
Coppered basic	8.00c.
Tinned soft Bessemer	9.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High Brass Sheet	28¼c. to 29½c.
High Brass Wire	28¼c. to 29½c.
Brass Rod	26¾c. to 29 c.
Brass Tube	42½c. to 44½c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29½c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$9.80	$9.55
		90 lb...	9.90	9.65
		100 lb...	10.00	9.75
IC...$15.00	$13.00	IC...	10.25	10.00
IX... 17.25	15.00	IX...	11.25	11.00
IXX... 19.00	16.75	IXX...	12.25	12.00
IXXX... 20.75	18.50	IXXX...	13.25	13.00
IXXXX... 22.25	20.25	IXXXX...	14.25	14.00

Terne Plates

8-lb Coating 14x20	
100 lb.	$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

Straits pig	63½c.
Bar	68c. to 73c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19½c. to 20c.

Spelter and Sheet Zinc

Western spelter	10½c. to 11½c
Sheet zinc, No. 9 base, casks	14c. open 14½c.

Lead and Solder*

American pig lead	9½c. to 10½c.
Bar lead	10½c. to 11 c.
Solder ½ and ½ guaranteed	43c.
No. 1 solder	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c.
Commercial grade, per lb	50c.

Antimony

Asiatic	12½c. to 13½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	35c. to 38c.

Old Metals

The market is quiet. Dealers' buying prices are nominally as follows:

	Cents Per lb
Copper, heavy and crucible	16.50
Copper, heavy and wire	15.75
Copper, light and bottoms	14.00
Brass, heavy	10.00
Brass, light	7.50
Heavy machine composition	15.50
No. 1 yellow rod brass turnings	9.50
No. 1 red brass or composition turnings	12.75
Lead, heavy	7.00
Lead, tea	4.75
Zinc	5.25